approach

NOVEMBER 1968 THE NAVAL AVIATION SAFETY REVIEW

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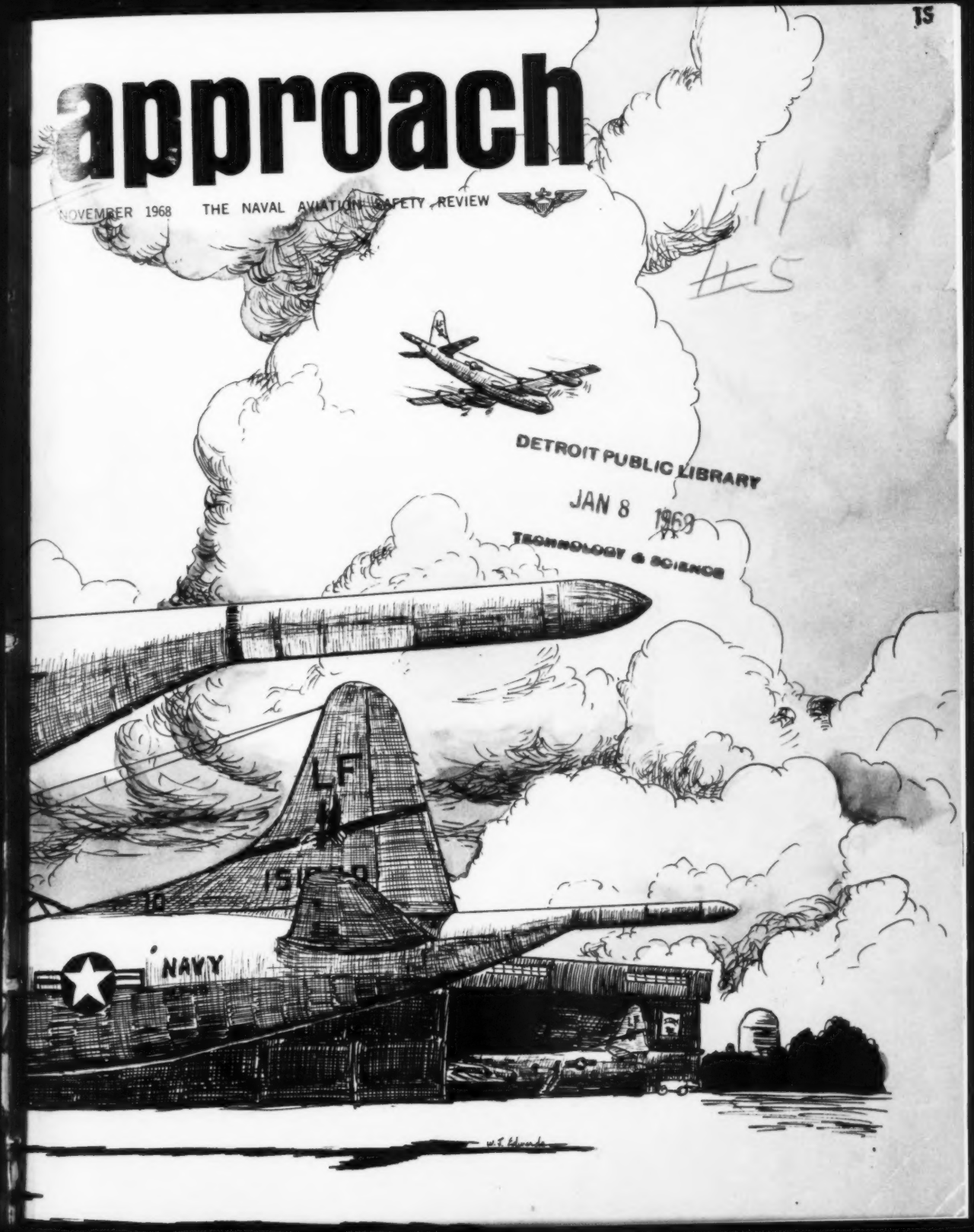
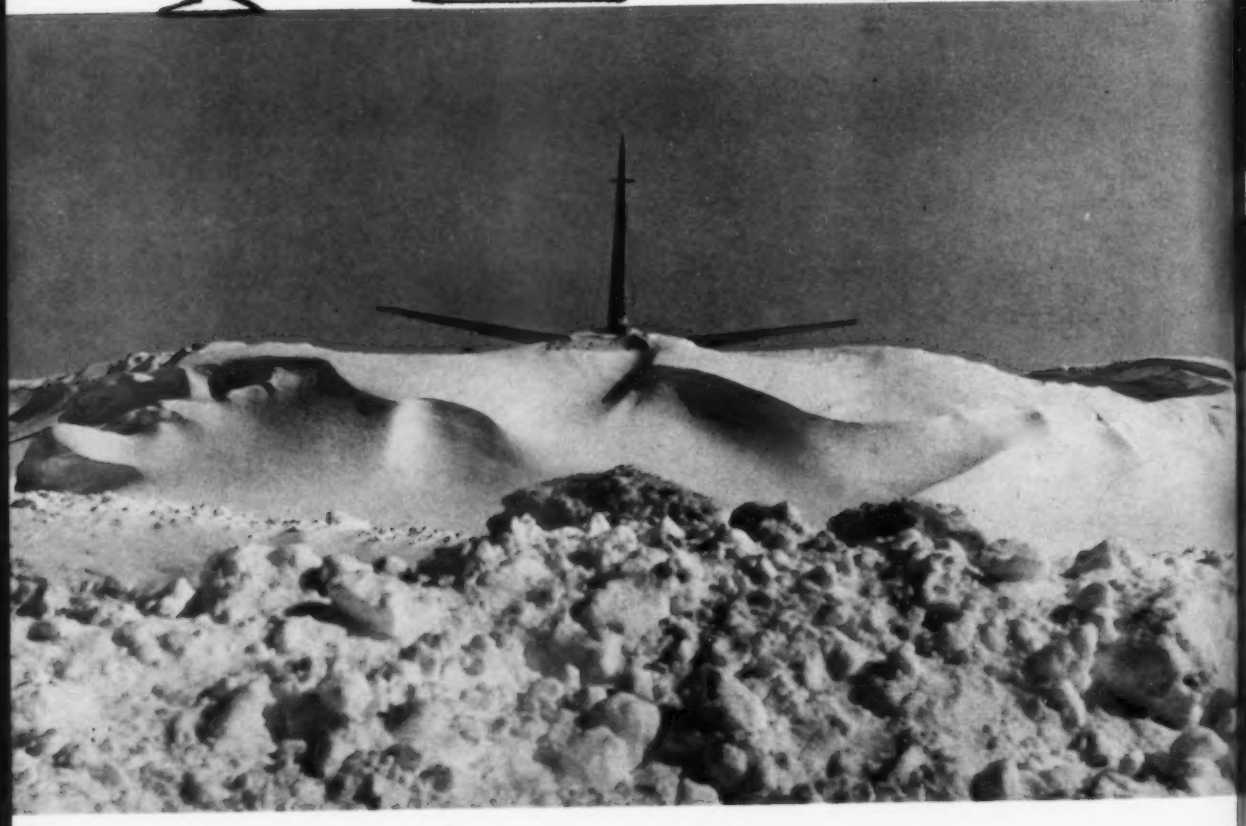


THE ICEMAN



BE PREPARED

COMETH

SEVERE winter weather is already a fact in some parts of the United States and will move progressively further south during the coming months until even sunny Florida will feel its bite.

If you're down in Pensacola, Corpus Christi – or Jax, New Orleans or San Diego for that matter – enjoying the balmy weather, you may not grasp at once the full implications of what the approaching cold weather means to you. You may have only vaguely acknowledged the coming of winter, expecting that as it becomes a reality, your friendly squadron safety officer will take the time to brief you on how it will affect local ops.

Therefore, it may take some forceful thinking on your part to imagine yourself touching down in the near future on an ice-glazed or snow-covered runway, peering through a frosted windshield while trying to cope with a max crosswind. You should realize, however, that it could happen and will happen to quite a few naval aviators during the next few months.

It will happen to some earlier than to others but it *shouldn't* happen to anyone unexpectedly. It is important to recognize now that

the 1200-mile maximum, usually approved for cross-country flights, has the potential to place at least a portion of your November to April cross-country flight in some honest-to-goodness winter weather, regardless of what point within the United States the flight may originate.

Your next cross-country flight, therefore, may place some unusual demands upon you, taxing your capabilities to the limit and perhaps beyond if you are not prepared.

To be prepared, that is the key! Meticulous IFR cross-country planning, always the mark of the professional, now becomes acutely important. *If* you plan to be prepared for the big flight, you should recognize that 10 minutes in the flight planning room and 5 minutes in Aerology, just prior to flight, will not hack the program. It may be that you won't have a whole week to leisurely plan the flight but don't skimp on planning. Do it fast if you desire or must but do it thoroughly.

There is no intent to detail here the ordinary requirements of cross-country flight planning but it is well to note that the usual and ordinary details assume an increased importance when viewed against the background of the additional problems posed by winter weather.

After the usual route planning has been accomplished, take the time to throughly review cold weather operations. Break out the NATOPS handbook and see what it has to say on the subject. It will point out a number of procedures and precautions to be observed but it may not cover them in the detail desired

Even the routine task of refueling this SP-2H is made more complex by the 20° temperature.

The 'How To' of Snow Removal

NAS Brunswick, Me., is the northernmost naval air station in the Continental United States. In winter, temperatures of -20°F are routine, and cumulative snowfall runs as high as 88 inches. Efficient snow removal is vital to its mission of providing all weather facilities to support ASW aircraft patrolling the North Atlantic.

Here's a thumbnail sketch of how an estimated average of *500 thousand tons* of snow and ice is removed annually from runways, taxiways, aircraft parking ramps and roads.

Snow removal is the responsibility of a cadre of 26 Seabees and 12 civilians under the direction of the station Public Works Department – supplemented by details from other station departments and tenant activities, as necessary.

Close liaison is maintained with NAS Aerology, and planning for snow removal begins about 12 hours in advance of a forecast snowfall. CFAW-3, whose squadrons are homeported as NAS Brunswick, notifies the station of desired priorities, which are then established for runways, ramps and parking zones. In addition, policing actions are undertaken to remove all loose chocks, fire bottles and other equipment which might hinder or damage snow removal equipment.

When the storm hits and the snow first begins to accumulate, jet brooms are used on the runways in order to maintain a clear centerline for pilot reference.

Quick-start bombs are fired, turning the motors of heavy equipment used for plowing. Push plows soon begin operating. Travelling at 40 to 50 mph in echelons of two, three or four, they plow the snow into windrows from the duty runway and taxiways. Simultaneously, snow removal operations start on the station roads and streets.

Squadron personnel move their own planes from parking areas. After these areas are cleared of snow, planes are returned to their original positions.

At an appropriate time, an airfield snow shovel detail is called out to dig out runways and taxi lights, emergency arresting gear and high intensity approach lights.

When piles of snow grow large enough to hamper push plows, the heavy weapon – rotary plows – are pressed into action. They eat their way through drifts of snow with augers which chew it up and drop it into fans which spew it out in a directional stream – depositing it at distances up to 150 ft.

At night, the runway lighting system illuminates the field and warns personnel of the arrival or departure of aircraft. Another protective measure is the presence, on the runway, of a radio-equipped vehicle which is in constant communication with the operations tower and the snow removal equipment.

NAS Brunswick maintains a proud tradition of never having been closed because of snow. – Based on material submitted by LTJG A. J. Turley, CEC, USNR, NAS Brunswick Public Works Department

or necessary. Get with some of the more experienced maintenance hands – and other pilots – and have a series of heart-to-heart talks about the aircraft and cold weather. Suggested topics:

Baggage

Stowing baggage is usually a problem in a single-engine aircraft. Insure that baggage or other gear is stowed so as not to create a hazard to the operation of the aircraft. In one incident, a flight jacket stowed in an ammo can in the nose of an aircraft shifted during flight and eventually fouled the nose gear uplock. Another potential problem is blocking the flow of cooling air to vital components.

If you are taking a multiengine aircraft, the problem of *where* to stow the gear will be simplified although not entirely eliminated. Caution must be exercised that gear such as mae wests which contain flares, CO_2 cartridges, etc., are not located near heater vents where they may be actuated by excess heat. Another problem may arise, also. Multiengine usually means multi-seat and the combined baggage, topcoats, gifts, etc., of crew and passengers can be a significant weight factor. Since many of the other hazards of winter flying such as ice accumulation also involve additional weight, the baggage could be an important consideration.

Aircraft Servicing

Of course you know the fuel grade required, even the oil grade. But do you know the specs for deicer fluid, defrosting compound, etc.? Find out these details well before your flight commences.

Moisture in fuel. Be aware of the dangers of moisture in fuel. During cold weather, moisture in fuel greatly increases operational problems. At lower temperatures, the water-dissolving capacity of the fuel is greatly reduced and will result in considerably more water accumulation (several gallons of water to 1000 gallons of fuel). When water separation occurs it will settle to the

Flight Clothing

Give some thought to the clothing and flight gear which you will wear. It may be a nice warm day when you takeoff but remember that your flight will take you into winter weather. If you have to bail out or are forced to land in a remote area, perhaps snow-covered, a summer flying suit is sure to prove inadequate.

bottom of fuel tanks and at temperatures below freezing may crystallize on fuel drains and internal valves. This can result in the inability to transfer fuel in flight and may cause fuel starvation of the engine. In particular, ice or snow in a fuel vent can stop the flow of fuel to the engine or possibly collapse a fuel tank. Know how to drain engine fuel strainers and fuel drain cocks as this duty may fall upon you personally during the trip.

Cold Weather Starts

Know the minimum temperature for starting without preheating. If preheating is necessary, know how it is accomplished; be familiar with the various preheating devices such as nose heaters, what they look like, how they operate and whether they are available at destination airport. Know how long the engine has to be heated before it can be started. Know how to preheat the prop dome, etc.

Starter operation. After you review what the manual says about limitations on starter engagement, talk to someone who knows what the damage is likely to be if these limits are exceeded. When you're trying to get the bird started at NAS Coldweather and it just won't start, the required wait for cooling will seem like eons. Realize in advance that if the engine doesn't kick off immediately, you may be sorely tempted to violate the established limitations, especially when any appreciable delay can mean unstrapping and trekking to the tower to refile your flight plan because of an aging weather forecast.

External power. If you have been used to making all your starts with battery power, review procedures for using external power. Indifference to the situation can result in damage to instruments and equipment.

Oil pressure. What should be done, if on start, oil pressure starts zooming and makes a bid to pass the redlined max? Do you shut down or throttle back to idle and cross your fingers, hoping that nothing "busts" before the oil warms up and the pressure drops? Now is the time to resolve all aspects of this subject, not during start.

Ice and Snow Removal Before Flight

No doubt your home-based maintenance people will insure that your aircraft is clear of ice, snow and frost before presenting it to you for flight. On the other hand, they may not. In any case, it will be up to you to insure that this chore is accomplished while you are away from home. Know the approved methods. When the aircraft surfaces are deiced, insure that water is not allowed to collect in and around control surfaces where it might freeze and adversely affect controllability of the aircraft.

Deicing Systems

Know all there is to know about how the aircraft is deiced in flight. Know the capacity of the fluid systems and how long they can be expected to provide deicing. Know the procedures for operation of wing and stabilizer boots during various kinds of icing. Review the effect of their operation on stalling speeds and know *when* they should not be used. Inadvertent use of boots on takeoff and landings could mean disaster as this raises the stall speed. In the case of jets, recognize that some have engine deicing systems which use compressor bleed air. This may result in reducing power and if used during an approach when the aircraft is already overloaded with an accumulation of ice . . .

Aircraft Heaters

Review procedures for their operation. Operation of some heaters while taxiing can be deadly. Also review defrosting and windshield rain/snow removal techniques.

Pitot Heat

Before flight insure that the pitot tube is free of snow, ice, etc. After manning the plane, but before takeoff, check pitot heat by operating the switch to ON for a short period. (Note: This will not be possible on some aircraft as the pitot heat is automatically off when aircraft weight is on the extended landing gear.) Avoid prolonged ground operation as the heating element can be damaged unless provided with a flow of cooling air. Be aware that during severe inflight icing conditions, the pitot tube may freeze up, even with the pitot heat ON.

Carburetor Heat

This system may be used frequently, but there are some fine points that need to be understood. Aircraft operations in warm or moderately cold areas may necessitate the use of carburetor heat only at cruising altitude or during descents. But, do you know when to use it on taxi, takeoff, approaches and landings? NATOPS will provide valuable information on this subject but a discussion with maintenance personnel and other pilots could prove very beneficial. Be sure to understand what its use does to your power, fuel consumption and range.

Oil Dilution

Does the aircraft you plan to take have provisions for oil dilution? If so, is the system operative or is it wired off? Should it be activated before the flight? The introduction of gasoline into engine oil systems tends to loosen carbon and sludge deposits, necessitating that all screens and filters be removed and cleaned shortly after the first such system actuation of the season. Therefore, if the system has not recently been actuated, it should be and the system cleaned before departure on an extended cross-country flight. Otherwise, it is entirely possible that the resultant sludge and carbon could cause engine failure before your return to home base. If the aircraft does not have an operative oil dilution system, is

manual dilution recommended? These are things you should know.

Landing Gear

During taxi, do not stop the aircraft for any appreciable length of time in deep snow or slush. Moisture may get into brakes and freeze. Also, if sufficient water is present on takeoff, the landing gear may freeze after becoming airborne. Because of the great force used to actuate landing gear and gear doors, they are not likely to freeze so hard and fast that the landing gear cannot be actuated; however, it has occurred. To preclude this, the landing gear should be cycled several times shortly after takeoff. The most likely malfunction is for the landing gear microswitches to freeze, giving a false indication of gear position,

Wing Slats

If snow, ice or other precipitation is encountered during flight, the strong possibility exists that the slats will freeze in the retracted position. This will mean higher approach speeds on landing.

Turbojet Engine Icing

Know the icing characteristics of your aircraft engine. Know how to recognize engine icing in flight and the operational procedures for minimizing or reversing engine icing. Some engines can be deiced with a system employing bleed air off the compressor. Remember that engine heat on shutdown after landing may melt ice which accumulated during flight. In this case the moisture may refreeze, after shutdown, in the lower section of the compressor and necessitate engine preheating to melt the ice before another start can be made.

Takeoffs

You will probably have more thrust available on takeoff because of denser air; however, this can be more than offset by other factors. If there is an accumulation of snow on the runway, plan on a substantially longer takeoff roll. Any form of precipitation present on the lifting surfaces constitutes a major hazard. It will not only require a higher airspeed for a safe takeoff, but may cause treacherous stalling characteristics. Remember that directional control will be difficult on slippery surfaces. Best control on takeoff (before control surfaces become effective) can be obtained with differential power and, sometimes, nosewheel steering. Brakes may be ineffective and takeoff in a slow-to-accelerate single-engine plane without nosewheel steering can be critical; in a high crosswind, it may be impossible.

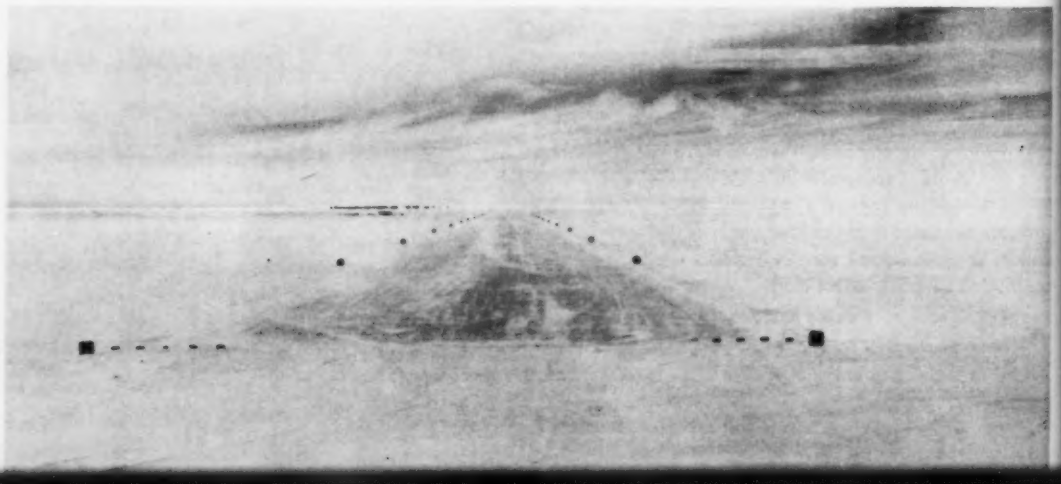
Landings

Landing an aircraft on a wet or icy runway can be a very hazardous undertaking, depending on the specific conditions. The length of the landing rollout will be appreciably increased. Plan on this and know the location and type of arresting gear available, if needed. Recognize that in an emergency, landing rollout can be significantly reduced by shutting down the engine. On touchdown maintain a course straight down the runway. Use aerodynamic braking to the maximum. Know the best management of flaps for increasing braking effectiveness. Use proper braking techinque, apply them lightly and evenly. Avoid heavy braking on ice as a wheel can be locked and a skid induced, even in an aircraft equipped with anti-skid devices.

More Detailed Study Recommended

This discussion of considerations in winter weather flying has been both general and brief; it is, therefore, hoped that the individual pilot will take the time to research these and other pertinent subjects in greater detail, as they apply to the pilot's own particular aircraft. A bibliography of references pertaining to cold weather ops is presented to assist you in further study.

Careful preflight preparation for the special demands of winter weather will go far toward insuring safe flight during the coming months. ◄



COLD WEATHER REFERENCES

Instructions

BuWepsInst 13460.2	Carburetor Heat Systems; instructions for use of
BuWepsInst 10360.1A	Windshields; rain repellent and antifogging compound for
BuWepsInst 13940.1	Oil Pressure Gages and Transmitters; cold weather operation of aircraft
BuWepsInst 10340.1	Fuel System; draining of free water and contaminants

Aviation Clothing and Survival Equipment Bulletins

Interim Aircrew Systems Bulletin No. 139 – Mk 5A Anti-exposure coverall exhaust valve diaphragm; inspection of

Aircrew Systems Bulletin No. 149 – Coverall, flying, anti-exposure, quick-donning; description, use, inspection and care of

Clothing and Survival Equipment Bulletin No. 10 – Coverall, flying, anti-exposure; Mk 5A

Clothing and Survival Equipment Change No. 7 – Mk 5A Anti-exposure suit; modification of

Clothing and Survival Equipment Change No. 8 – Mk 5 liner, retrofitting for use with Mk 5A anti-exposure coverall

Clothing and Survival Equipment Change No. 28 – Survival knife Packet and signal kit (flare gun) packet; fabrication and installation of

BuWeps Aviation Clothing and Survival Equipment Bulletin No. 60-61 – Coverall, flying, anti-exposure, Mk 5

BuWeps Aviation Clothing and Survival Equipment Bulletin No. 41-62 – Suit, flying, anti-exposure Mk 4; instructions for fitting, use and care of

Miscellaneous

BuWeps NA00-80T-52	Safety and Survival Equipment for Naval Aviation
BuWeps NW00-80Q-31	Carrier Cold Weather Starting Sense
BuWeps Tech Note 5-55	Turbojet Engine Icing
FAA-AC-91-12	Cold Weather Operations of Aircraft

Navy Training Films

MN 7474A – Ground Handling of Aircraft in Cold Weather – General Maintenance Procedures
MN 7474B – Ground Handling of Aircraft in Cold Weather – Taxiing, Towing, and Securing
MN 7474C – Ground Handling of Aircraft in Cold Weather – Preparing Aircraft for Flight
MN 9372 – Anti-icing and Deicing Systems for Airplane Surfaces
MN 9487A – Ice Formation on Aircraft
MH 7491 – Cold Weather Training – Indoctrination and Survival
MN 9549 – Mk 5 Anti-Exposure Suit

Approach Articles

Jul 67, page 20	Frozen Slats (Anymouse)
Jun 67, page 10	Wet Asphalt Runways
Feb 67, IBC	Be Careful of that Ice on the Taxiway
Oct 66, page 16	Runway Condition: Ice, Snow, Water, Slush
Jan 66, page 18	Ice on the Runway
Nov 65, page 24	Cold Facts

HEY,

THE PILOT and BN of an A-6A were returning to their ship in the Gulf of Tonkin after a combat mission. It had not been a tough one. This particular day had been uneventful. They had not dodged any SAMs and they even had a couple of their own missiles still hanging on the plane. In addition they were carrying a couple of drop tanks and a refueling store. So it's pretty easy to deduce that this bird was not about to set any kind of speed record.

In order to keep sharp on his instrument flying the pilot decided an unusual attitude maneuver or two would be good practice. He was cruising at 16,000 ft, using about 90 percent rpm and indicating 310 kts. The weather was good. He was well above a broken layer – tops about 3500 ft – just above a haze layer. The pilot had decided to use his VGI as the primary attitude instrument. His entry into the maneuver was smooth. He pulled the nose up, about 10 degrees above the horizon, and began a right flaperon roll. After passing 90 degrees of roll he reduced the rate and allowed the nose to fall below the horizon. As the nose-low inverted position was reached, he reversed the roll until he had wings-level. However, when he pulled back on the stick to level the nose there was no control response. There was no back pressure and the controls were extremely sloppy. Of course the pilot suspected a control malfunction as most pilots would. He was definitely nose-low. His speed was building fast. The noise level was increasing.

Now What

The pilot was not aware of a stall. The BN noticed the angle of attack indicator bouncing between 12 and 3 o'clock positions but didn't say anything to the pilot.

WAIT FOR ME!!

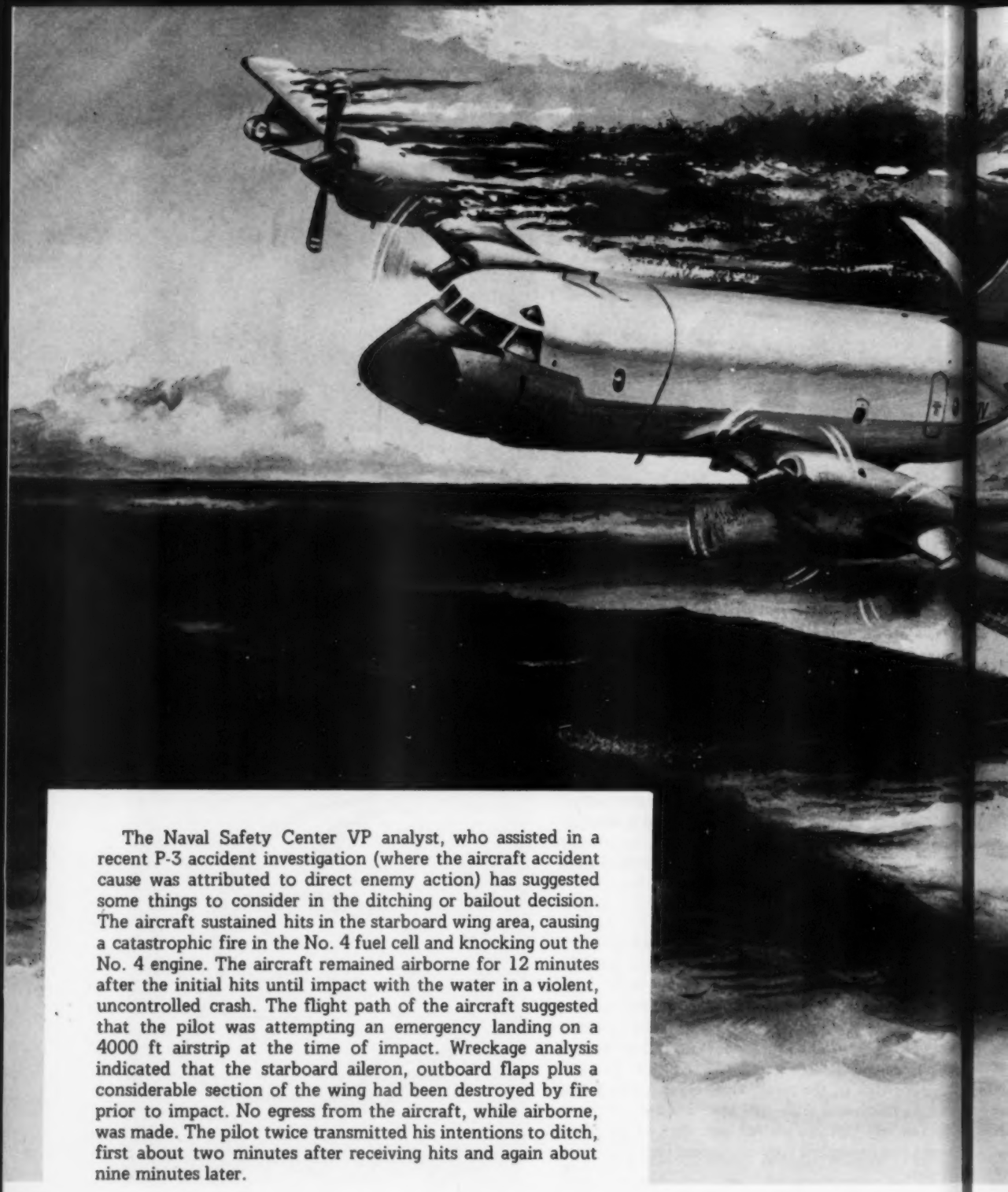
The aircraft was experiencing a rapid roll rate according to the VGI. The pilot applied opposite rudder with no effect. No high G forces were felt. The pilot then transmitted a *Mayday*, blew the canopy and told the BN to eject.

When You Gotta Go . . . . . .

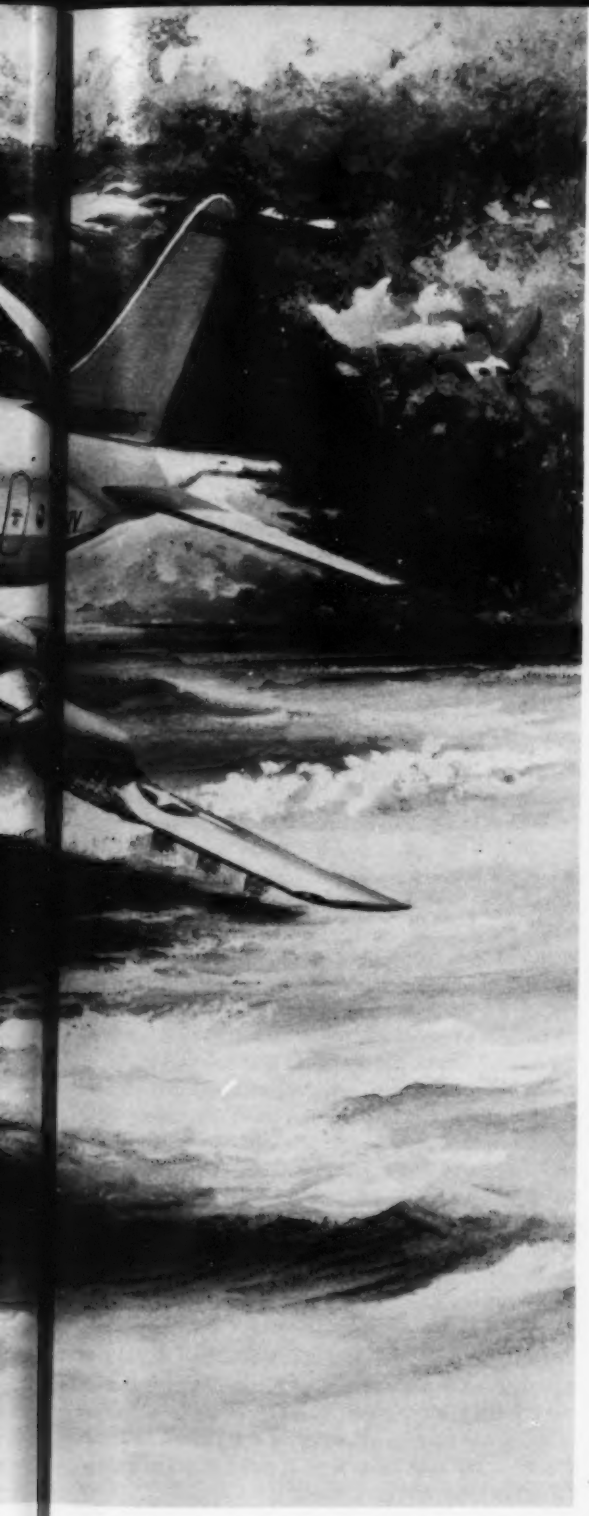
The BN needed no further encouragement; he ejected without delay. Then he watched in utter amazement as things immediately got better. He didn't know that the pilot, while trying to eject, had a minor cockpit problem. The BN saw the rotation stop and the plane become level. The pilot found that the bird would respond to the controls. He quickly forgot about trying to eject and undertook flying the plane again. He stopped the roll, leveled his wings, and recovered at 2500 ft and 275 kts. The pilot successfully landed his plane back aboard and the BN was picked up by helo with little or no trouble. As Mel Allen says, "How 'bout that, sports fans?"

Reflections

Neither pilot nor BN could understand how the plane stalled and entered a spin – if it was a spin. Certainly proper spin recovery techniques were not used. There are those among you who will have many explanations for what happened but without question this is a classic example of *spatial disorientation.* It is not known what effects the external stores had on the stall/spin characteristics of the plane. This episode could trigger many a readyroom session. As a pro could you, if put to the test, say that you use full scan when on the gages? Could you recognize a stall/spin in your bird? *Could you recover?*



The Naval Safety Center VP analyst, who assisted in a recent P-3 accident investigation (where the aircraft accident cause was attributed to direct enemy action) has suggested some things to consider in the ditching or bailout decision. The aircraft sustained hits in the starboard wing area, causing a catastrophic fire in the No. 4 fuel cell and knocking out the No. 4 engine. The aircraft remained airborne for 12 minutes after the initial hits until impact with the water in a violent, uncontrolled crash. The flight path of the aircraft suggested that the pilot was attempting an emergency landing on a 4000 ft airstrip at the time of impact. Wreckage analysis indicated that the starboard aileron, outboard flaps plus a considerable section of the wing had been destroyed by fire prior to impact. No egress from the aircraft, while airborne, was made. The pilot twice transmitted his intentions to ditch, first about two minutes after receiving hits and again about nine minutes later.



Ditch or Bailout

CDR J. L. Fletcher, USN
Former Aircraft Operations Analyst, NavSafeCen
CDR Fletcher is now an instructor in Aeronautical Engineering in the Aviation Safety Program at the U.S. Naval Post Graduate School, Monterey, California.

The major unanswered question pertaining to this fatal accident is why bailout or ditching was not effected prior to loss of flight control. Answers to this question are quite complex and would be pure conjecture, but one thing for sure, the subject of ditching and bailout from the P-3 should be expounded upon.

The decision of whether to bail out or ditch primarily involves aircraft control. When loss of control is considered imminent, bailout *must be initiated and executed* in a quick, orderly fashion. Wing fire forward of the flaps or aileron, damaged or binding control surfaces that make slow flight impossible and complete power loss comprise some of the conditions that would influence a pilot's decision to bailout. Wing fires, exclusive of the engine nacelle forward of the fire wall, constitute the most precarious situation where loss of control is imminent. Rapid bailout in this case is strongly recommended since the execution of a successful ditching is unlikely once the flap/aileron surfaces are destroyed. The aircraft's position relative to possible surface rescue vessels has an important bearing on the bailout decision. To scatter the crew in an open ocean many miles from a surface vessel with only a life jacket for survival is questionable and should be resorted to only when ditching cannot be accomplished. The possibility of attaching a compact one-man raft to the parachute harness should be investigated.

I believe that the P-3 can be safely ditched, contrary to the old wives tale being circulated on the hangar deck. *True,* the P-3 has not been involved in a successful ditching to date; however, the accident reports of five

collision-with-water type mishaps all conclude that the aircraft were either inadvertently flown into the water or the pilot lost control and subsequently stalled/spun prior to impact.

My opinions of P-3 ditching capability are based on two factors: my seaplane open-sea experience and the airframe construction/configuration of the *Orion.* In comparison with other types, the P-3 closely resembles the C-118 transport, i.e., low-wing monoplane equipped with four propeller-type engines and a pressurized cabin. Tests conducted by NACA and actual ditchings clearly indicate that the ditching characteristics of the C-118 and other low-wing pressurized aircraft are good.

Of the many factors to consider in ditching an aircraft, weight and speed at touchdown are probably the most critical. A reduction in weight will reduce the forward momentum after touchdown. This will provide for a shorter deceleration period and a reduction in impact force. A short runout or deceleration is particularly important when the distance between swells is relatively short such as in the Atlantic Ocean. Dumping or consuming fuel will also improve the buoyancy of the aircraft. The forward speed of the aircraft at touchdown must be as low as possible, consistent with the desired angle-of-attack and gross weight. I would recommend an attitude of 17 to 18 units angle-of-attack with the power levers at or near FLIGHT IDLE position upon impact. The expected G-force at this AOA is estimated at 2 Gs. Runout distance should be about 600 ft.

The swell is the primary factor in evaluating the sea for ditching, since it normally is the greatest force or factor. In the event that essential information concerning the sea conditions is not available from a ship in the local area, the sea may be evaluated through the use of smoke. Do not attempt to evaluate the sea conditions at extremely low altitude since there are usually two or more swell systems in the open sea. Combined with the height of the swell, currents and wind conditions, the sea will appear confused at low altitude. The *primary swell* is more apparent at altitudes between 1000 and 1200 ft, depending upon light and sky conditions. After selecting a ditching heading based upon swell evaluation, the heading should not be altered more than 10 degrees. Serious considerations should be given to the relationship between swell and wind direction. With winds from 0 to 35 kts – land parallel with the major swell and downswell to the secondary swell system. *Winds over 35 kts – land into the wind* since the reduction in groundspeed will improve the overall ditching problem. A successful open-sea ditching of a low-wing four-engine transport was accomplished alongside an ocean station vessel in a crosswind of 40 kts. It is interesting to note that in this ditching a second impact did not occur.

When ditching parallel to the swell, a crosswind will usually be present so that crabbing is needed. Do not lower the wing more than is necessary. Attempt to touch down on the receding (back) side and near the top of the crest, parallel with the swell. Do not attempt to land on the face of a rising swell. At night or under instrument conditions when sea conditions are not available, the best course of action is to use the known surface wind and set up a landing pattern in that direction.

The wing flaps in all probability will be carried away at touchdown and, therefore, will not provide a plane to give a nose-down action. It can be expected that the propellers will separate from the gear box upon contact with the water and will pass beneath the wing. The props did not exhibit a tendency to *walk the water* in the latest accident as they will do on firmer terrain (runway, ground, etc.); therefore, there is no necessity to secure an operative engine prior to ditching. Ditch while power is available using *minimum asymmetric power* to reduce the minimum control airspeed (Vmc air). When the approach is made with power, the aircraft may be dragged along the approach path until a comparatively calm sea is found for touchdown. While this procedure is permissible, it should be emphasized that the judgment of height, particularly at night, will be difficult; therefore, during darkness it would be preferable to establish the lowest possible rate of descent and maintain this descent until contact.

After touchdown, the aircraft should be held on the water. This does not mean that the control column is to be forced into the full nose-down position. Conversely, the control column should not be pulled full back, or nose-up immediately after contact, since it is possible for the aircraft to become airborne again. The resultant stall and damage can be considerable. The force to be applied to the control column will depend upon the planing action encountered. That is, when an appreciable nose-down or nose-up force is felt, an approximate counteracting force should be applied. Unless the pilot has had previous experience in seaplanes, a neutral position of the control column throughout the runout is recommended. The runout is relatively short and the design of the landplane fuselage does not indicate that an appreciable change in attitude can be accomplished in the time available.

This information is not intended to replace, but to supplement the ditching/bailout comments contained in the P-3 NATOPS Manual. Remember that safe ditching of an aircraft requires maneuvering control and power. If and when the conditions prevail, make your decision to bailout or ditch and stick with it.

'This is a drill, This is a drill, This is a dr---'

Here's a first-hand account that should be of interest to every pilot and crewmember who has operated off a nonaviation ship and to personnel of all ships with a helicopter platform whether helos operate regularly or only occasionally.

"While assigned to a new DLG as combat SAR in Tonkin Gulf we had planned several practice emergency SAR launches to familiarize the ship with helo operations of this nature and to improve our reaction time. My copilot was experienced as the result of a previous cruise on a CVA. I had thoroughly briefed my crew (I thought) on immediate launch procedures such as we use in the combat zone. While the ship was enroute we had a practice SAR alert. The ship announced, SAR alert . . . SAR alert . . . Aircraft down over . . . Pilots have ejected 300 yards off the coast.

"We manned the helo. The crew performed as briefed to this point. The copilot jumped in and started the engine while the ship started a turn into the wind. I strapped in and put on my hardhat. The copilot meanwhile had given the signal for starting rotors and received an affirmative from the LSE. When I had my hardhat on I said, 'I have it' and commenced completing the rotor engagement while the copilot put on his hardhat and turned on the radios. The helo was spotted on the DLG flight deck centerline. As Nr approached 80% I noticed that I was losing control of the aircraft and that the helo was trying to move left. Coming through 85% Nr I had no control of the aircraft whatsoever.

"I then realized that the ship was still in a turn. I screamed over the loud hailer for the ship to stop turning (the radios were not on the line) but received no reply and since I had 100% Nr signaled the LSE to remove tiedowns and chocks. I had gained marginal control and lifted the helo off. It was a downwind takeoff but I was afraid to risk staying on deck any longer and cause a deck crash or rotor out-of-balance condition. The temperature was cold and I was sure I could takeoff OK as opposed to risking an accident by remaining on the deck – the ship still turning. I made a 14 kt downwind takeoff, max power and then had to drop collective to keep my turns up, holding about four feet above the water. After this I was shaking so hard that I couldn't fly the helo and had to give it to the copilot who seemed cool and unaware of what was going on.

"The cause of this near-accident was that the LSE gave us a 'clear to engage signal' while the ship was still in a turn and the OOD had not authorized engagement of rotors which is *standard* practice. The LSE was experienced and had simply forgotten a most important procedure due to the immediate nature of the simulated SAR. The fact that rotor engagement on nonaviation ships must have clearance from the OOD cannot be overemphasized."

The only comment on this outstanding but soul-baring story is:

The hurrieder you go
The behinder you get. - Ed.

UH-2
Open Sea Salvage

APPROACH magazine welcomes the opportunity to reprint this enlightening article written by Mr. Robert J. Myer, Customer Service Manager, Kaman Aircraft Company. This article originally appeared in the May/June/July issue of KAMAN ROTOR TIPS.

"There are times when salvage operations are practical and should be attempted, because of the value of the aircraft, and because it will give investigators the opportunity to determine the cause for ditching so corrective action can be taken. The following article deals with the subject of UH-2 open sea salvage.

"RECENT coordination with our WestPac Service Representatives concerned the raising of a submerged UH-2 from a depth of approximately 95 ft. The success of the operation not only returned much needed equipment to service, but also allowed a determination of the cause for ditching. Our research included a review of the salvage information developed during the ComNavAirLant Open Sea Salvage Conference held in 1963. At that time, ComNavAirLant expressed the opinion that, because of a lack of a workable salvage plan, many recoverable aircraft were abandoned or sunk. Subsequently ComNavAirLant Instruction 11135.1, dated 7 December 1963, entitled 'Open Sea Salvage of SH-3A and UH-2A Aircraft; recommended procedures for' was released for use by aircraft carriers, squadrons or any ship equipped with heavy cranes.

"A review of our records revealed only 25 percent of UH-2 helos ditched at sea were effectively recovered and returned to service. Three recovered aircraft were stricken because of damage induced during salvage. The unrecovered aircraft fell into three categories: (1) Floated initially but were sunk or left to sink due to the ship's lack of salvage capability, or tactical circumstances; (2) Marginal flotation because

FLOTATION GEAR – The primary objective is to keep the UH-2 afloat long enough for the crew to leave the aircraft if it must be abandoned immediately after an emergency water landing is made. When such a landing is to be made, the bags can be inflated and, if sufficient power is available, the rotors kept turning to augment stability. Depending on the circumstances, it may even be possible to taxi the helicopter as shown in the above photo.

flotation bags detached or did not completely inflate; and (3) Contacted water without flotation bags deployed.

"It seems apparent that if detailed salvage procedures for specific aircraft had been available, a larger percentage of ditching aircraft would have been recovered. It also seems apparent that, regardless of the circumstances, the key elements in effecting a successful salvage operation are: (a) evaluation of tactical commitments; (b) having salvage procedures available and personnel familiar with them; and (c) having the necessary equipment.

"As with all tactical situations, the final decision concerning possible salvage rests in the hands of the ship's commanding officer. Naturally, if he is aware of the relative ease with which successful salvage operations can be accomplished, a decision to salvage rather than abandon or sink could probably be influenced by the detachment and/or aircraft salvage personnel. To assist the C.O. and his men in arriving at the most expedient decision, the salvage procedures will be presented under these two headings: A. Required Equipment and B. Position of Aircraft in the Water.

Required Equipment

"The equipment must necessarily be substantial enough to handle the weight of the helicopter. Normal weight, with no personnel and a full fuel load, is approximately 9000 lbs for a UH-2A/B and 10,400 lbs for a UH-2C. (Due to bouyancy effect, aircraft underwater weight would be 1000 to 2000 lbs less.) If the cabin and tail cone are full of water, the aircraft will weigh an additional 10,000 lbs. Also, a factor of 3 or more should be applied to these weights in order to compensate for any sudden accelerations caused by sea surface conditions. Recommended equipment is:

1. Aircraft-type cargo crane, rated 50,000 lbs minimum.

2. Hoist Adapter, P/N K604010-1, or an equivalent line capable of handling 50,000 lbs within 20^0 of vertical plane – attached to main rotor hub.

3. Nylon lines, straps, manila lines or steel cable – used for primary or supplementary lifting, righting, guiding, and towing.

4. Minimum of two Mk-4 liferafts – used to stabilize and keep aircraft afloat.

5. The following assorted tools should be available: Quick-attach hooks, snatch blocks, various size shackles, hatchet, heavy duty bolt or cable cutter, hack saw and blades, marlin spikes and a large screwdriver. (Tie safety lines to tools to avoid loss during over-water handling.)

Position of Aircraft in the Water

"The salvage methods are directly related to aircraft attitude and location. Recommended procedures are provided relative to the five following procedures:

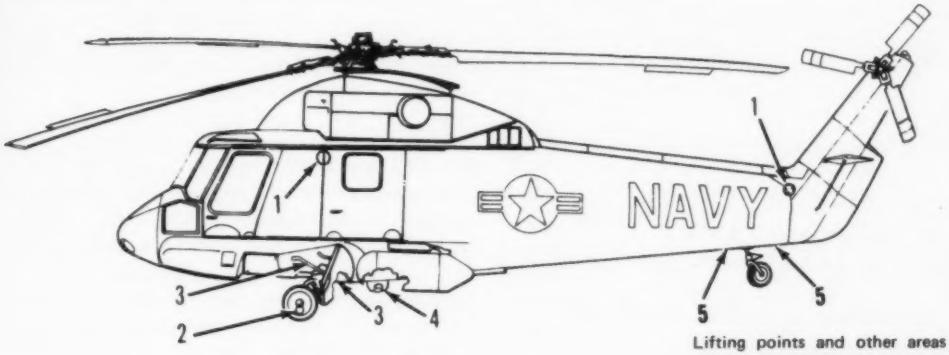
Position A. *Afloat upright and apparently stabilized.*

1. Attach lifting lines or adapter.
2. Attach guide lines.
3. Slowly lift helicopter aboard.

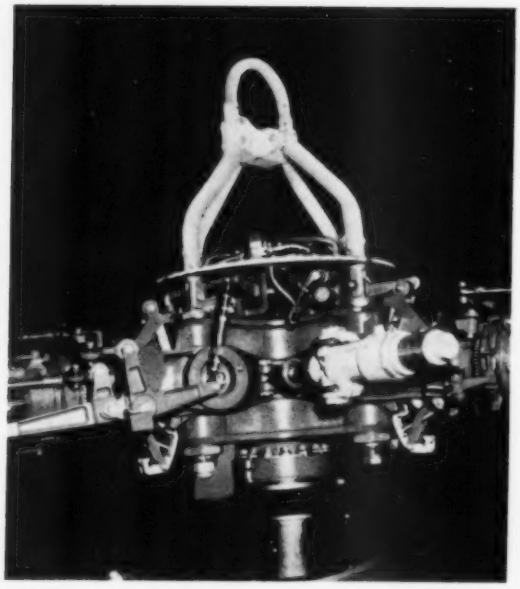
Position B. *Inverted and marginally afloat.*

1. Attach two Mk-4 life rafts to stabilize and keep aircraft afloat.
2. Secure safety line to latched cargo hook; take up slack.
3. Have divers attach righting line(s) to main rotor hub area.
4. Take up on righting line; allow slack on cargo hook line until aircraft is turned 90^0 (on its side with rotor hub visible).

Continued



Lifting points and other areas on the UH-2 with which salvage crews should be familiar are shown above. 1. Fuselage tiedowns (4) 2. Wheel tiedowns (2) 3. Landing gear members 4. Cargo hook 5. Tail cone



5. Install lifting adapter or lifting line to rotor hub and take up most of slack. *Caution:* Avoid taking up all slack in lifting line at this time because variations in water surface can apply sudden loads.

6. Detach cargo hook and auxiliary flotation device lines (liferafts).

7. Attach guide lines and roll aircraft upright.

8. Slowly lift aircraft out of water. *NOTE:* Hoisting out of water slowly will enable water to drain. If faster drainage is required, chop holes in the skin at the rear portion of the tail cone.

9. Complete lift; carefully lower onto deck, flush with fresh water and commence preservation.

Position C. *Aircraft floating stabilized but inverted.*

1. Proceed with Position B, step 2.

Position D. *Aircraft sunk and on bottom in inverted position.*

1. Have divers attach lifting line to latched cargo hook.

2. Slowly lift helicopter to surface.

3. Proceed with Position B, step 2.

Position E. *Aircraft sunk and on bottom upright or on its side.*

1. Attach lifting line to main rotor hub area.

2. Slowly lift helicopter to surface.

3. When at surface, recheck security of lifting line (lifting adapter may be installed at this time).

4. Take up most of slack and proceed with Position B, step 8.

"Two additional considerations worthy of mention are the possibility of attaching lifting lines to the main landing gear strut members if the cargo hook is inaccessible or damaged and the option of removing main rotor blades if required to facilitate righting or lifting operations. The most suitable location to sever blades is across the two flat plate aluminum spar extensions just outboard of the folding pin. The control rod and wires in this area can be readily parted with a heavy duty bolt or cable cutter.

READY FOR SALVAGE – With step 1 of Position B accomplished, the downed bird is ready for a salvage crew to start the righting sequence which will eventually return the aircraft to service. (USN photo)

"In conclusion, it is fully recognized that the above salvage conditions do not take into account the many possible unforeseen, uncontrollable situations or circumstances associated with emergency operations of this nature. For example, weather and sea state can adversely influence any of the recommendations presented here, not to mention tactical situations in unfriendly waters or other mission priorities. It is hoped, however, that this review of an old operational concern will help influence the decision in the affirmative as to whether or not to attempt a UH-2 salvage when satisfactory or marginal conditions exist." ◄

Time to Winterize!

THAT time of year is here again! Since the next few months are going to be miserable for most, dealing with gale winds, ice and snow, it might be well to review some of the things we are going to have to face. We'll leave the explanations about frostbite, the treatment of URIs (upper respiratory infections) and squadron cold weather lectures to our friendly flight surgeons. We won't abandon but we will leave snow removal to the overworked, capable public works people. So lets consider some facts about winter flight operations – what we will be faced with trying to taxi, takeoff, fly, and land.

The state of the art in anti-icing and de-icing equipment is reflected in the good, reliable systems we have in our present generation of aircraft. However, no matter how good the systems are they can only *help* fight winter weather. Alone, like most of us, these systems can't cope with nature in the raw. But together, the man-machine combination can effectively combat all but the extremes in winter flying.

Taxiing

When ice and snow are on the surface caution is dictated for all taxi operations. Nosewheel steering frequently is lost completely and braking action can be ineffective under certain conditions. Remember, painted lines are usually obliterated so that taxiing between rows

of aircraft can be dangerous. Only one plane parked a few feet forward of the usual place or a slide by the taxiing plane can cause a crunch. A taxi director and wing walkers are the best insurance during operations in crowded areas all the way out to the wide, main taxiway. Easy does it!

Takeoff

One procedure, more than any other, to guarantee a good takeoff is smooth application of power. If that bird starts straight down the runway it's usually easy to keep it straight with throttles, rudder, ailerons and nosewheel steering in that order. Except for a little roughness due to the uneven surface on ice and packed snow the takeoff is not much different than other takeoffs. If there is slush or dry snow on the runway, look out! With only one inch of slush you will need 50 percent more runway than you would ordinarily need.[1] If there are two inches of slush theoretically you cannot get airborne no matter how long the runway. In the figure below increased distances needed for takeoff are shown for different depths of slush and dry snow on the runway.

Slush Depth	Dry Snow Depth	Increase In Distance
1/4 inch	3 inches	6%
1/2 inch	4 inches	15%
1 inch	6 inches	50%
2 inch	10 inches	Infinite

It's easy to see from the above presentation that slush and dry snow, even though pretty to some people, are dangerous to aviators under all conditions.

The FAA conducted rather extensive tests at Atlantic City with a *Convair* 880 under controlled slush conditions on a 10,000 ft runway in various slush depths from 0-2 inches. Some interesting facts[2] were brought out as a result of these tests, such as:

- Magnitude of slush forces were greater than predicted.
- Slush spray against aircraft and landing gear was a significant factor in producing slush drag in addition to that of tires.
- Nosewheels produce greater slush drag than main landing gear. Accumulation of slush in recessed areas indicated the possibility of an operational hazard with subsequent freezing after takeoff and climb to altitude.
- Noise and vibration levels increase with slush depths.
- No serious adverse control problems were found. Nosewheel steering was not attempted. Rudder control was normal. No excessive forces were needed for liftoff out of the slush.
- Aquaplaning occurred above 100 kts.

From these facts drawn from various measurements and from photographs, quite a few conclusions were drawn. Chief among these were:

- Substantial impingement accumulation occurred on the underside of the fuselage, inboard flap surface, inboard wing surface, rear wheels, main wheel wells, recessed areas behind flaps and inboard air inlet ducts.
- Ingestion is improbable except for aircraft with aft fuselage or wing-root-buried engines.
- Impingement and aquaplaning are major factors affecting magnitude of slush drag forces.
- Considerable wheel slippage of unbraked nose wheel tires and forward main landing gear tires rolling in slush occurred while the aft main landing gear wheels experienced only slight slippage.

Landing

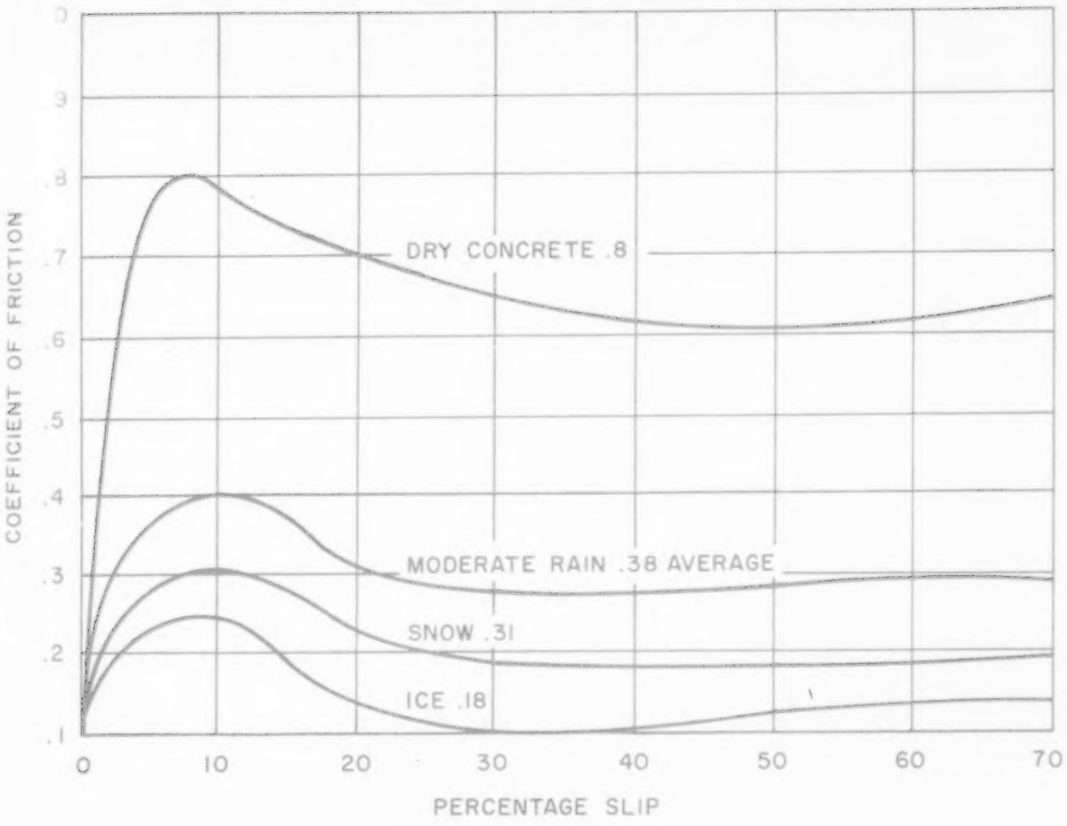
Another critical phase to be considered is to get the plane down and stopped. If a landing is attempted with a load of ice extra speed must be maintained to touchdown and then dissipated on rollout. Friction, of course, is needed to keep a straight course during takeoff and, more so, during landing. Maintaining runway heading on landing rollout under crosswind conditions, on a slippery surface, gets real hairy! Got to have that friction. The coefficient of friction of tires is derived from friction force divided by normal force and is a function of many factors, i.e. *runway* (surface condition and composition), *tires* (tread and pressure), *speed* and *brakes.*

The most effective use of brakes occurs at the peak coefficient of friction just prior to skidding or tire slip. The figure below is used to show approximately the effect of tire slip on the coefficient of friction under different runway conditions.

Certain generalities may be made from the above figure. Snow, for instance is more than twice as slippery as dry concrete. Ice is more than four times as slippery as dry concrete.

[1] "The problem of slush on runways has become more important since the advent of jets because of the need for higher takeoff speeds than for props. Acceleration takes longer. Hydrodynamic forces increase due to water and slush on the runway and because high ground speeds operate in such a way that tires are lifted from the ground." *NATO AGARD 500* – Problems Associated With the Presence of Water, Slush, Snow, and Ice On the Runway – H. R. Herb

[2] The above facts and conclusions were adapted from FAA Project 308-3X, Runway Slush Effects on the Takeoff of a Jet Transport.



The figure above comes from NASA Report 20, Tire to surface friction coefficient measurements with a C-123 airplane on various runway surfaces. By R. H. Sawyer and J. J. Kolnick

Speed has a great effect on the coefficient of friction on slush and water covered runways. Hydroplaning or aquaplaning results when speeds reach a point when friction is slight or nonexistent. The tires under this condition do not contact the surface but slide along on a thin film instead. As speed decreases, the tires tend to stop sliding and braking action becomes possible. Aerodynamic braking, reverse thrust or popping the chute, and main landing gear brakes may all be used but with caution and only as recommended by NATOPS for your bird. The problem is *enough* real estate. Existing concrete is mighty easy to use up.

Over the years different scales, different methods and different numbers have been used to indicate what braking action exists at an airport at a given time when covered by ice and snow. Unfortunately standardization still has not taken place but within the Navy, similar to civilians, the adjective base is used while the Air Force uses the numbering system. The figure below explains.

Runway Condition Readings

RCR	Braking Action	Increase in Landing Roll
01 to 05	Poor	100% or more
06 to 12	Fair	50% to 99%
13 to 25	Good	0 to 49%

As recently as Sept 1968 NavAirSysCom answered a CNO query by recommending a revision of the RCR to include the adjective "nil." Efforts to standardize are continuing among the Navy, Air Force and FAA.

Know your bird and its cold weather equipment, check the icing conditions enroute and take care lest a snow job gets you down!!

The Sky is Falling

RECENTLY, an eyewitness observed an object to fall from the sky and land in the middle of our flight line. The incident occurred at about 1030 local, and the object was determined to be a CO^2 cartridge from an Ansul 30-lb P-K-P fire extinguisher. The empty cylinder weighs about 1-3/4 lbs and measures 10 inches long by 2 inches in diameter. The point of impact was where the man is standing in the photograph of the flight line. The TA-4F normally parked in the spot near the point of impact was moved about two hours earlier to allow room for close order drill. At the time of the incident, the drill had fortunately been secured, however, men were working on the TA-4F shown in the picture.

The source of the cartridge cannot be positively determined, however, witnesses state that a transient P-2 aircraft had drifted to

This cartridge fell onto the flight line apparently from a transient P-2 at pattern altitude.

The lonesome looking gent indicates where the cartridge landed on the flight line.

ANYMOUSE

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. As the name indicates these reports need not be signed. Self-mailing forms for writing Anymouse Reports are available in readyrooms and line shacks. All reports are considered for appropriate action.

— REPORT AN INCIDENT, PREVENT AN ACCIDENT —

the right of the normal traffic pattern and was overflying the flight line at the time the cartridge landed.

Miraculously, no injury or damage resulted.

It seems unlikely that a fire extinguisher cartridge, such as the one you describe, could have accidentally fallen from an aircraft unless it was improperly stowed or left in some unauthorized and unlikely place on the aircraft. The thought that it could have been intentionally jettisoned from an aircraft by some pilot or aircrewman, without regard for the safety of personnel on the ground, is unpalatable but conceivable.

Aircrews must remain continuously aware of hazards posed to personnel on the ground by objects falling or being jettisoned from an aircraft. In this case, severe injury or death could easily have resulted had the circumstances been only slightly different.

Flight Responsibilities

MY FLIGHT was filed (IFR) for FL 260 from NAS Homeplate to NAS Otherplace. The route requested was Homeplate 4 departure to XFX, direct to FXF, direct to NAS Otherplace 284/39 (IAF). The aircraft was a T-1A. The clearance given was direct to XFX, *Maxgross*, Direct Crunch, Direct Longhold, Direct Lottaair, Direct NAS Otherplace 284/39 to maintain FL 180. I declined the clearance as 3 check points *were not* in the structure for which I filed. Center refused to give a clearance using high altitude fixes.

I took off VFR and attempted to get a clearance from Other Center. The second clearance was virtually the same as the first, again at FL 180. I told center that I had no low altitude charts and asked them to define Maxgross Intxn. I then accepted this clearance, but reluctantly!!!

On deck I called the Other Center supervisor who saw nothing wrong with the clearances and who stated that pilots must be prepared to fly *both* structures!!!

Conclusion

(1) Center erred in defining a route in the high altitude structure utilizing low altitude structure fixes.

(2) A need for refresher training exists.

(3) An A-4, F-8, etc. pilot flying a single-place bird has no space for a C-118 type Nav Bag nor time to navigate fixes 12 miles apart and Centers should be aware of this.

(4) This sort of occurrence discourages IFR flying when weather permits or results in a pilot accepting a clearance with which he is not able to comply in IFR conditions.

ANGRY MOUSE

Here is a prime example of a pilot who recognized a clearance he could not comply with and took a stand. He recognized the situation and took command of his flight early enough to head off a possible untenable set of circumstances. This is the fortunate opposite to the crew in PLANNING for the UNPLANNED on page 12 of last month's APPROACH.

In this case, as in many others, this Mouse was forwarded to the appropriate agency (the FAA). A reply received states in part that the controllers were wrong. The Chief of the Center has taken corrective action by discussing it with his controllers and has advised his personnel of the importance of complying with these procedural requirements.

This is a classic example of what cooperation between military and FAA will do to solve a problem.

Aero-1A or -1B Retro-Ejector Inspection

RECENTLY a Mk 25 smoke marker was left in the barrel of a retro ejector after it had jammed in flight. The ordnanceman forgot to offload the round after landing and the next day the round was fired by another ordnanceman on a supposedly dry run. Luckily, no injuries or damage resulted.

The second ordnanceman had visually inspected the retro, looking down through the top opening, but from this view a round in the chamber cannot be seen. To preclude personnel error causing such a potentially dangerous incident, a procedure should be devised to offload jammed rounds while in flight.

Our Canadian brothers who fly the P-2 have come up with just such a procedure. A very small inspection hole exists at the end of the retro, in line with the barrel. This has been enlarged to 1-3/4 inch diameter. A 12-foot long, 1-1/8 inch diameter aluminum ramrod is used to manually clear the barrel. The ramrod is divided into three, 4-foot long sections which can be individually inserted into the retro and joined. In this way the retro can be positively cleared in case of a jammed round or electrical malfunction, while the aircraft is in flight.

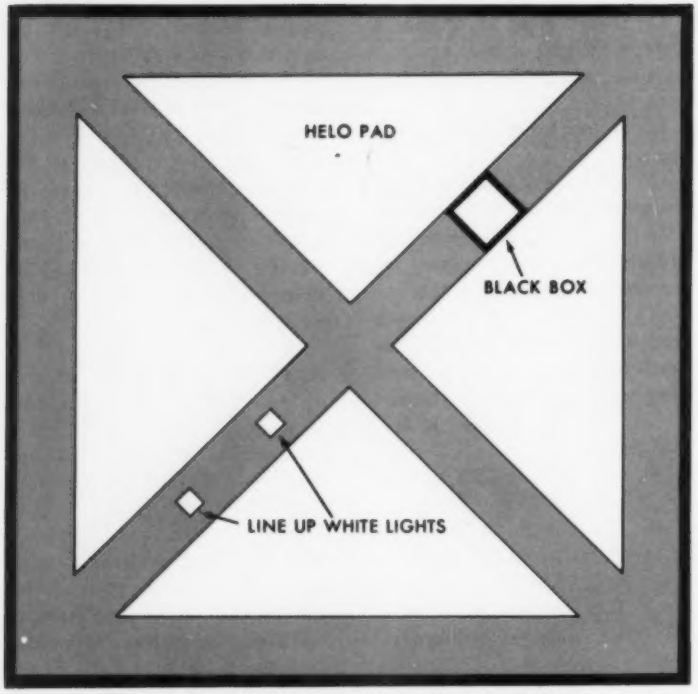
Tightrope

A T-33B returned to home base after an RO2N. The trip was routine, except for one problem, which was noted on part B of the *yellow sheet:*

"Nose gear needs strut change. Strut body is cracked; had it inspected and jacked up. It looked safe. Made three takeoffs and landings, *carefully*, after discovery with no problems.

Snoopy would know better! ◄

FORUM:



ANGLE OF APPROACH LIGHT AA-1 MIL-L-19891 (AER)

MCAS East/West/Anywhere

Once upon a black night-leery?
Droned a chopper, turbine cheery.
Gages green, pilot Shake
*BT pick up, piece of cake
A touch of vertigo-then so hairy!

Low and slow, looked up and out,
Black as hell, devil's snout.
Not so level, nose is down.
Left seat muttered, "Not me drown!"
As he upped collective to armpit – about.

Just in time to save the bird.
Wheels got wet, but who heard
The observer mutter, "A better way
To make the pickup safe as day."
Use Angle Approach Light, that's the word.

*Bombing target

HELOMOUSE

▲ It's been suggested that Angle of Approach Light be bought and put in the middle of the pad to help helo pilots on night approach avoid vertigo. A couple of low powered white lights are also needed for lineup. The artist's sketch shows the idea. What do you pilots think of the idea?

Flight Lunches

Recently the subject of possible pilot/copilot food poisoning from inflight lunches came up in a safety council meeting. Council members were well aware that many activities have local rules regarding preparation, handling and consumption of flight lunches; however, they did not know if there are any high level directives governing this matter.

ANYMOUSE

▲ Article 1-58 of Chapter I, Food Sanitation (Rev 1965), in the Manual of Naval Preventive Medicine (NavMed P-5010) is particularly germane to the problem:

> "(1) The 3-hour maximum time permitted for holding cooked protein foods at temperatures between 40^0 and 140^0F. is of particular importance in the case of special meals (boat meals, flight meals and recreation parties). When preparing and using sandwich fillings containing meat, meat food products, poultry, fish or eggs, it is essential that close galley supervision and liaison with using units be maintained to insure continuous refrigeration. These foods shall be prepared and cooked in accordance with the methods prescribed in the Navy-Marine Corps Recipe Service. Such fillings shall not be held longer than *3 hours* between temperatures of 40^0 and 140^0F. (total lapsed time in the galley and aboard aircraft or boats). Unopened cans of meat, chicken and tuna may be issued in lieu of meat sandwiches when consumption is not anticipated

Unlike the flight control systems on present day high performance aircraft – the Naval Safety Center desires a continued feedback.

Has information in any Safety Center publication ever helped you to prevent an accident, avert an injury or deal with an emergency in a better way?

If so, and you have not already informed the Safety Center, it is particularly desired and important that you do so. Such feedback is vital to all departments at the Center and for fiscal support of our safety research and education program.

Do you have a question regarding material or procedures now in use in Naval Aviation? For an answer send it to FORUM, Naval Safety Center, NAS Norfolk, Va. 23511.

within the 3-hour time limit between 40° and 140°F. In these instances bread and butter sandwiches may be issued with the canned items to permit members of the using unit to make their own sandwiches if they so desire.

"(2) The preferred method of handling sandwiches for flight and boat meals is as prescribed (above). If it is not feasible to follow this procedure, sandwiches may be frozen and handled in the following manner:

"(a) Freeze only freshly prepared sandwiches that contain ingredients suitable for freezing.

"(b) Wrap each sandwich separately in a double thickness of heavy waxed paper or in moisture-vapor-resistant material. Fold wrapping material tightly and seal. Mark the wrapper, using a wax pencil to indicate that the sandwich has been frozen and the date of preparation.

"(c) Immediately after wrapping, freeze sandwiches at 0°F., or below. Store at the same temperature. Do not store longer than 7 days.

"(d) Inform using units that sandwiches shall be consumed within *5 hours from issue* (time shall begin when sandwiches are removed from the freezer).

"(3) All types of flight rations shall be carefully packaged to preclude the risk of contamination and exposure during transit from galley to plane."

The Navy's Preventive Medicine Units under management control of the Bureau of Medicine and Surgery provide specialized advice and recommendations on food sanitation. Units are located at Norfolk, San Diego, Pearl Harbor, Naples and DaNang.

Helmet Paint

Our squadron has painted its helmets black with red and white reflective tape used for the squadron design. However, I doubt that dark paint is permissible because it cuts detectability and absorbs heat. Is there a bulletin which covers this?

PARACHUTE RIGGER

▲ NATOPS (OpNavInst 3710.7D) states, "The latest available approved type protective helmet, adorned with high visibility paint/reflective tape, shall be worn by all crewmembers and passengers in combatant aircraft and single engine training aircraft."

Air Crew Systems Bulletin 82 of 15 Sept 66, "Helmet, Protective, Pilot's: refurbishing of" states, "The shell should be finished with one coat . . . of surface primer (MIL-P-233377 or equivalent), and one coat of . . . white coat (MIL-C-22750 or MIL-L-19537 or equivalent)." Amendment 1-60A to ACSEB 1-60, "Pilots' Protective Helmets, application of reflective tape to increase detectability," makes an exception for application of reflective tape to protective helmets worn in combat areas "where easy detection of downed pilots and aircrewmen is undesirable."

Mk-3C Inflation During Parachute Descent

In "SCUBA and Naval Aviators" in the June 1968 issue, the statement is made, "After an overwater ejection, with a standard parachute and normal descent, a man will sink 5 to 15 ft beneath the surface of the water and he will immediately resurface." We of Paramedic Rescue Team No. 1, flight surgeons, parachute qualified with water jumps using standard Navy gear and SCUBA qualified, have been particularly interested in problems of this area.

After many jumps with a variety of landing wind conditions and body positions, we are convinced that if an aviator only inflates his Mk-3C life preserver prior to water entry, his head will not go under water more than two feet at a maximum, thereby circumventing the whole problem. This is borne out by the experience of the Navy test jumpers we have interviewed at the Aerospace Recovery Facility, El Centro.

It is surprising how many aviators do not inflate their Mk-3Cs until *after* water entry. This impressed us after personal interviews with several who have taken South China Sea swims. May we suggest that flight surgeons and ASO's emphasize the extreme necessity of inflating the Mk-3C *before* water entry as per NATOPS requirements.

Thank you for your accurate coverage of one of our rescues reported in the same issue.

LCDR R. L. SMITH, MC
LT H. B. HOWELL, MC
Paramedic Rescue Team No. 1

▲ Thank you for your excellent letter. All wearers of the Mk-3C should be familiar with their individual NATOPS requirements for life preserver inflation. The rescue coverage referred to is "Breath of Life," page 24, June issue.

Each copy of APPROACH is meant for ten readers.

PASS IT ALONG!

THE WALK A

Walking is a healthy form of exercise, partic[illegible]y whe[illegible]
The walk around has produced some startling [illegible]ts in th[illegible]
However, some pilots are hard to convince. [illegible] you k[illegible]
following affect the quality of their walk aroun[illegible]

Days Out With some, the inspection becomes increasingly less thorough with each additional leg of the trip. Then, too, for each day out the seriousness of any given mechanical deficiency decreases in importance.

Weather If the weather is cold and rainy the aircraft gets the three-gears, engine, two-wings, one-tail check. Good enough *most* of the time? Is that good enough for you? When the weather is nice and warm, it has to be a pretty small item to go undetected, especially if the inspection is performed in a good RON town.

Time (Available or Allowed) Some pilots don't allow enough time for a full preflight as they have more important things to do. Shop? Package store? Call a friend? They may be right. Time remaining for them is shorter than they think.

Poor
poorly
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LK AROUND

rtic y when it's done around an aircraft on preflight.
ing s in the past, such as bird nests in airscoops, etc.
ce. you know aircrews that would let any of the
oun

Poor health If they are feeling poorly, eyes a little bloodshot, or butterflies stomping around in the old bread-basket and they just want to lie down . . . . in this case a walk to the BOQ would be more appropriate . . . . could be that check will be a little skimpy.

Knowledge Few things affect the quality of the walk around as much as not knowing what to look for.

Amount of Light Night walk arounds without a flashlight are generally more rapid.

Courtesy Luke AFB

Dental Problems at Altitude

A TOOTHACHE anywhere is bad news but a toothache while you're flying is trouble you can do without. Given the Navy's high standards of dentistry and considering the number of hours pilots and aircrewmen fly, this doesn't happen often. When it does, it can be extremely painful and sometimes incapacitating.

Toothache at altitude, known medically as aerodontalgia, usually represents an acute flare up of subclinical symptoms. Reduced barometric pressure is the precipitating factor, either in flight or during a pressure chamber run. Some years ago, the cause was thought to be simply expansion of gas trapped underneath fillings. More recent thinking is that changes in atmospheric pressure aggravate the impaired circulation in irritated or diseased tooth pulp.[1] Reduced barometric pressure usually does not affect normal teeth or teeth with open cavities.

Generally speaking, toothache at altitude occurs during ascent and begins at 5000 ft. Some persons have only one episode of pain with no recurrence. In other cases, the toothache shows a consistent pattern occuring at a specific altitude and disappearing at the same altitude when direction is reversed.

If pain occurs during ascent, the tooth is usually vital. If pain occurs during descent, the tooth is probably non-vital, perhaps one in which the nerve has been removed.

A less frequent source of toothache during ascent is the presence of an abscess at the root of the tooth. Such an abscess can generate a small amount of trapped gas which causes severe pain on expansion. In other cases a chronic abscess can cause dull pain on descent which can persist on the ground for several days.

When toothache strikes at, say 14,000 ft, the only thing you can do about it at the time is descend and even this is not always immediately possible. On completion of the flight or chamber run, get in touch with your flight surgeon or dental officer.

The offending tooth may turn out to be one which was recently filled. Speaking at a meeting of military physiologists last year, an Air Force dental surgeon stated that it has been his experience that it usually requires 48 to 72 hours for the dental pulp to quiet down after dental treatment. In some cases, a new filling

[1] *Lucian Szmyd, DMD, and C. M. McCall, Jr., DMD, Aerospace Medicine, Armstrong, 1st ed., Williams and Wilkins, Baltimore, p. 468.*

causes symptoms for several weeks and then as tissue changes stabilize, symptoms no longer occur. Deep-seated silver fillings without underlying base materials or insulators, mechanically imperfect fillings and inadequately filled root canals can be troublemakers when barometric pressure is reduced.

In some cases when a tooth hurts at altitude the trouble is not in the tooth itself; it hurts because of pain referred from some other source. Pressure in the maxillary sinus during descent can cause pressure on the tooth nerves of the upper jaw which, in turn, causes the teeth to ache. If dental examination fails to reveal abnormalities, the possibility of aerosinusitis should be checked out.

Another source of referred pain is inflammation of the gum around a partially erupted tooth. Unerupted or impacted third molars or wisdom teeth can also cause referred pain. Sometimes the diagnosis of the source of trouble in toothache at altitude is complicated by referred pain from a blocked ear.

(Although not related to toothache at altitude, it should be noted here that some ulcers of the mouth and lips can become painful in flight if the oxygen mask causes pressure on them or if oxygen is flowing over the area.)

Flying right after dental surgery can be hazardous. Besides general discomfort, a number of factors enter into dentists' and flight surgeons' advice to postpone flying for a certain period:

- Variations in barometric pressure can bring about secondary hemorrhage. This can also occur after gum treatment if there is still some active infection present.
- Some patients experience dry socket or loss of blood clot after extraction.
- The maxillary sinus is sometimes affected.
- Pain and other symptoms occur as late as the fourth post-operative day in some patients.
- Medication given dental patients can compromise aircrew efficiency and safety.

Some experts are of the opinion that clinical experience indicates that flying should be routinely restricted for 48 hours following tooth extraction and that the patient should be re-examined before return to duty.[2] It is for these reasons that Navy dentists and oral surgeons will recommend grounding of a pilot or aircrewman for 48 hours following a surgical procedure.

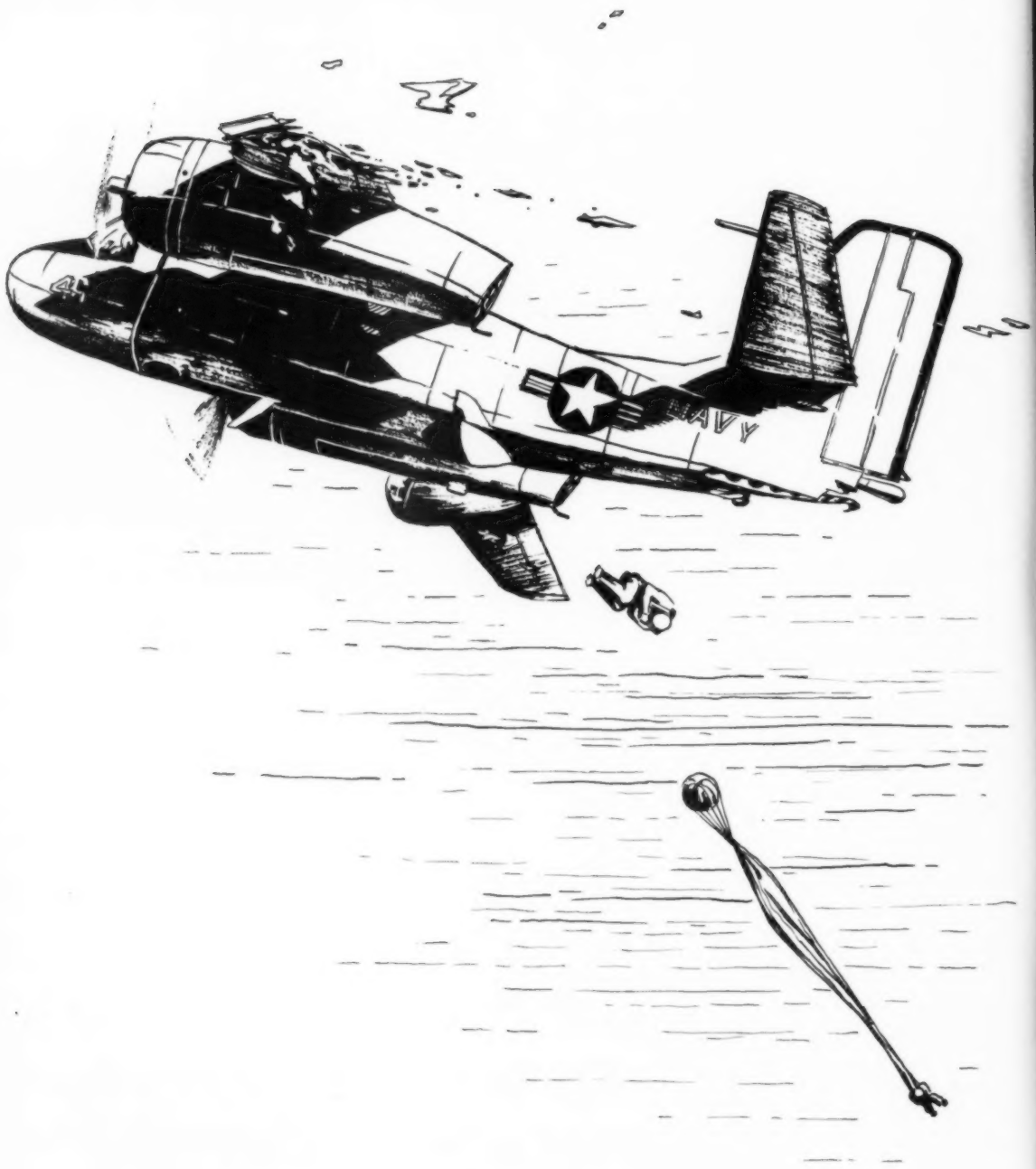
Now for a few words on how you get dental cavities in the first place. Research on the cause of tooth decay is a continuing process. However, there seems to be general agreement that the chief factors are mouth bacteria, food, dental plaque and susceptible tooth surface. Bacteria break down food debris in the mouth and produce acid. The dental plaque on the surface of the teeth collects the acid and holds it. (Oddly enough, in some persons dental plaque neutralizes the acid.) Then depending on the tooth's susceptibility to decay, the acid works on the tooth until the acids are neutralized by the saliva. One dental authority has stated that acid production in the dental plaque is intermittent rather than continuous lasting 30 to 45 minutes after meals or snacks containing fermentable carbohydrate.[3]

Bacteria in the mouth build acid up rapidly after you've eaten carbohydrates. Sticky solid carbohydrates such as candy bars are said to lead to more cavities than those consumed as liquids such as soft drinks. Most dentists will advise you to cut out those sweet between-meal snacks altogether or replace them with raw fruits or vegetables, cheese, eggs, unsweetened milk, nuts or lean luncheon meat. Even if you can't brush after every meal or snack, you can get rid of some of the food debris by rinsing your mouth out with water or swishing it around in your mouth before you swallow it. Dental floss or a toothpick will dislodge bits of food between your teeth.

Granted the irregular schedule inherent in the Navy pilot's and aircrewman's jobs often makes conventional "proper oral hygiene" next to impossible. However, try to brush after meals and snacks or at least rinse out your mouth. Schedule your dental appointments regularly and once you've scheduled them, if at all possible, keep them. And, finally, as in all aeromedical matters, good general physical condition and sensible eating and drinking habits are good preventive medicine. Your good health and good oral hygiene, plus the ministrations of a skillful Navy dentist when required, should keep dental trouble at altitude to a minumum. ◄

[2] *ibid, p. 470.*

[3] *Dr. Samuel Dreizen, "Diet and Dental Decay," Postgraduate Medicine, March, 1968, p. 235.*


NAVY

S-2E BAILOUT

ON an early morning post calendar inspection test flight from a carrier, the pilot of an S-2E lost sight of a second S-2E while flying in extremely close proximity. The result was a midair collision at 5000 ft. Of widespread interest is the fact that the three-man crew of the first S-2E made successful bailouts. (The second S-2E made a wheels down, no flap landing, swerved and skidded off the runway, impacted trees, struck a mound of macadam and flipped inverted. Three crewmembers survived; the pilot did not.)

Omitting operational details and discussion of the midair collision and its aftermath, this article deals with the bailout experiences of the first S-2E crew.

Following the midair collision, as the pilot attempted to regain control of the aircraft, he instructed the crew to strap on their parachutes. Control was established nose low, 20-25 degrees right wing down and heavy right rudder pressures. Rate of descent was about 1000 fpm. Attempts to bring the nose up caused severe control pressures. When the aircraft began to stall at 150 kts, the pilot increased speed.

"I was sure that this airplane could not be landed safely and at this point I discussed with the copilot ditching vice bailing out," the pilot states. "At first I was hesitant about bailing out, primarily because I recalled previous discussions with more experienced pilots who would not advocate bailing out of an S-2 under nearly any circumstances. However, I had convinced myself that it could be done, mainly because of a movie I had seen which showed repeated successful bailouts from an S-2E at different airspeeds and altitudes.[1] Because of the high airspeed necessary for control and the high rate of descent, approximately 1000 fpm, I decided that a ditching at sea would not save any lives and I elected to bail out."

[1]The movie referred to was made by VS 37.

As the copilot held the controls, the pilot continued to assist on the rudder and quickly snapped on his parachute. He took control of the yoke once again, told the crewman to bail out and radioed his intentions and position to the ship. The crewman bailed out somewhere between 3000 and 2500 ft; between 2000 and 1500 ft the copilot followed. The pilot held on to the yoke as long as possible on the way out and bailed out below 1000 ft. He did not attempt to use the AFCS (automatic flight control system) during his bailout because control pressures were too severe and he felt the AFCS would aggravate the situation with unneeded gyrations.

Here are the crewman's, copilot's and pilot's descriptions of their bailouts:

Crewman: "I was looking down into the JEZ recorder when I feld a severe jolt. It sounded like it came from left of me, slightly aft. The first thing that entered my mind was that we had contacted the water with the left wing tip. I looked out the window and saw we had enough altitude to make that impossible. The very next thing I did was to tighten and lock my harness because the aircraft was not maintaining stability. The pilot then informed us that we were in trouble and shortly after that he told us to prepare for bailout.

"A short time later, after I put on my chute in less than a minute with no trouble, the word was passed for me to go ahead and bail out. I shot a glance to the cockpit to see what our altitude was but my view of the altimeter was blocked by the pilot getting his chute on while the copilot had the aircraft. I acknowledged the order to bail out and went aft. The seat was already forward but I didn't fold my console. After I pulled the emergency release handle, the main hatch came off real fast. *(NATOPS requires the No. 4 operator to fold the aisle console-seat full forward. The copilot states the console in the aisle did not slow his exit. – Ed.)*

"I crouched in the hatchway with one hand on the D-ring and the other on the hatch rim. (I didn't have to worry about the ICS cords because my helmet was binaural and the leads unsnap right at the base.) It didn't take much effort to exit because the suction kind of pulled me out. As soon as I cleared the hatch, I pulled the D-ring. This was the only time I was really concerned because I had no idea what altitude I was at and didn't know if I was going to make it or not.

"The chute opened with a very severe jolt that knocked the wind out of me. My chute had two panels ripped, one panel apart in front. The next thing I did was undo the strap across my chest and try to get up in the seat better but I was unable to do so. Close to the water, I put my hands on the two leg strap releases and exited the chute approximately 10 ft above the water." *(Because of the difficulty in estimating altitude above water due to reduced depth perception when points of*

reference are lacking, this is a very unwise procedure. The Parachute Manual, NavWeps 13-5-501, states, "After hitting the water, remove the harness or release the canopy and then inflate the life vest . . . . If time permits when using harnesses which are equipped with ejector snaps, unsnap the chest snap and enter the water with one hand on each leg ejector snap, actuating these ejectors after entry into the water. Inflate the life vest after immersion.")

"I didn't go more than about 2 ft under the water," the crewman continues. "I immediately tried to locate the toggles to my life vest. While trying to find the toggles, I had no trouble staying on the surface. The vest didn't inflate as much as I thought it would but it kept me just on the surface. The chute came down almost on top of me and I was drifting into it, or vice versa, and getting slightly tangled up in the lines. The raft was close by so I started to unsnap it from the container because I couldn't remember if the raft would come out if you pulled the toggle while it was still in the container." *(Correct procedure is to follow the lanyard, pull the toggle and the raft will come out of the container inflated.)*

"After the raft inflated, I snapped the lanyard to my vest, got aboard the first time I tried and removed all the shroud lines. At this time, observing a helo and an S-2E overhead, I ignited a day flare. The helo departed and then turned back toward me so I tried to light off another flare. Neither end of this one would work. I then lit off the night end of the first flare so the helo could get a wind direction.

"When the helo was overhead, I was a little hesitant about getting out of the raft because of the shroud lines around; I didn't want to get tangled up again. However, I thought that it would be easier for the helo if I got out of the raft so I jumped out. I raised one hand for the sling and with the other tried to unhook the raft lanyard but I was having trouble getting it off because of my gray flight gloves. They were slippery from oil, I guess. For some reason I didn't want to get rid of them although things would have been a lot easier without them. I got into the sling with the raft lanyard still attached, which is why I couldn't get into it correctly, but finally I got the lanyard off." (Although the crewman entered the sling backwards, once the raft lanyard was released he was rescued without difficulty, SAR personnel reported.)

Copilot: "Shortly after the impact the pilot told the crewman and me to strap on our chutes, which we did. As we were unable to maintain both airspeed and altitude we had to sacrifice altitude for airspeed. Feeling that the aircraft would not fly well below 150 kts, we talked it over and decided to bail out instead of trying to ditch with the risk of breaking up. As we passed through

2500 ft, the pilot told the crewman to go ahead and bail out. I took the aircraft while the pilot put his chute on. The crewman bailed out successfully and after the pilot completely took the aircraft I rolled out of my seat and crawled aft. The No. 4 operator's console was in the aisle but it did not slow down my exit. I hit it with my hand as I went by, crawled on back to the main entrance hatch and bailed out successfully."

The copilot entered the water in his harness and released his parachute. He inflated his life vest but, like the crewman, did not get the buoyancy he had expected. He did not attach his lanyard and did not retrieve his pararaft for fear of getting trapped in shroud lines. He used both Mk-13 Mod O flares but neither worked. Entering the sling correctly, he was hoisted without difficulty.

Pilot: "I was still holding the aircraft straight until the copilot had jumped out. I held on to the yoke as long as possible on my way out. The last time I saw the altimeter, it read 1000 ft.

"My chute deployed normally and I watched the aircraft enter the water and burn. I entered the water, released the chute pack, inflated my mae west and then popped out the inflated life raft and climbed in. The next thing I knew the helicopter was overhead and I was hoisted up inside."

The pilot also entered the helicopter rescue sling backwards and had removed his helmet, the Rescue Report notes. *(For the correct way to enter the rescue sling see "Rescue Sling," p. 30, December 1967 issue.)*

Investigators' Comments

In commenting on the crew's escape, investigators noted that egress was orderly and well-planned. Prebailout procedures were accomplished properly except that the AFCS was not engaged, the aircraft was not slowed to 120 kts and the aisle console was not folded by the crewman. As the pilot stated in his narrative, he decided not to engage the AFCS and not to slow the aircraft to 120 kts due to the uncertain control characteristics of the aircraft below 160 kts.

Post-bailout procedures were accomplished properly, investigators said, except that all crew members pulled their D-rings immediately after exiting the aircraft and the crewman slipped himself from his parachute and fell into the water from a height of approximately 10 ft. The Rescue Report noted that the crewman entered the sling backwards and on first hoist still had his raft attached. When lowered back into the water, he got rid of the raft but remained in the sling backwards. This necessitated the helo crewman bringing him into the aircraft frontwards in order not to pull him out of the sling.

Investigators thought that possibly the Mk 13 Mod 0 flares which did not ignite had exceeded service life.

Commenting on the investigation report, one endorser had the following to say:

"Although the S-2E in question was at 5000 ft when the collision occurred, it is apparent that crewmembers did not have parachutes fastened to their bodies. Fortunately, the pilot did not lose complete control of the aircraft and there was time for all to successfully bail out. A narrow sampling of Air Anti-Submarine Squadrons revealed that parachutes are fitted prior to launch but are seldom worn thereafter. Although paragraph 823a(1) of OpNavInst 3710.7D states that parachutes are required for test flights, there is some ambiguity as to applicability. However, on all test flights it appears prudent to require the wearing of parachutes, particularly when the flight is to be conducted above 1000 ft. The March, 1968 VS/VAW/VRC section of Crossfeed provides interesting data on bailouts from S-2 aircraft and provides a case for the mandatory use of parachutes above 1000 ft."

For those readers who missed the Crossfeed referred to, here are the statistics updated to the beginning of FY 1969:

Ditching Statistics S-2 Aircraft FY 1959 through FY 1968
Operational Mishaps Only

1. Controlled Collision with Water 4 fatalities 53 survivors	18 aircraft destroyed
2. Uncontrolled Collisions with Water 86 fatalities * 38 Survivors	38 aircraft destroyed
3. Control Undetermined 3 fatalities	1 aircraft destroyed

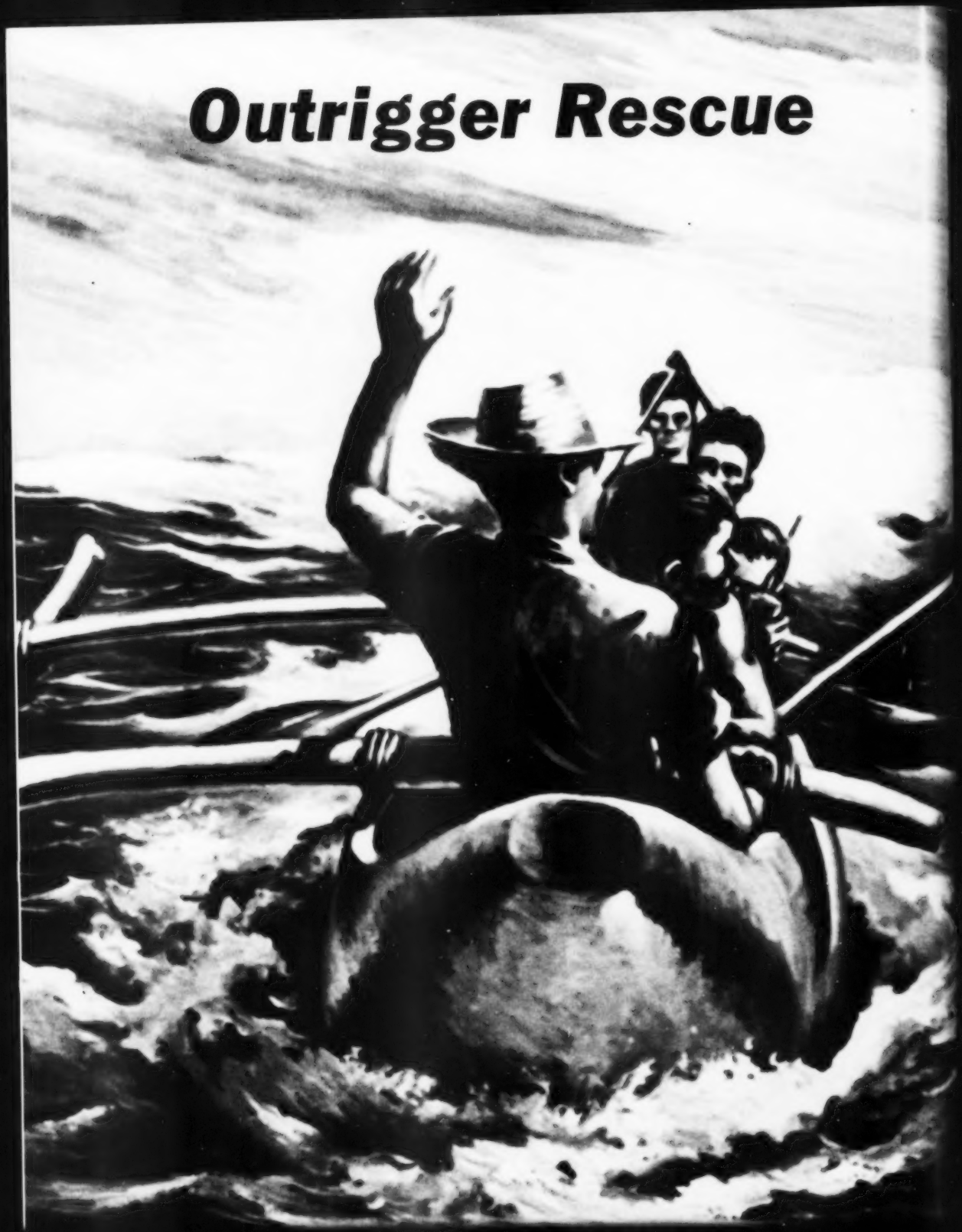
*One of these fatalities was a brakerider who was lost at sea when the aircraft went over the side.

The Safety Center VS/VAW/VRC analyst went on to summarize the bailout picture for the S-2 in the same Crossfeed:

"Bailout Statistics S-2 Aircraft (All Years): The recent mid-air collision in which three crewmen successfully bailed out brings the total of personnel who have bailed out of S-2 aircraft to eight. Six of these were successful. The other two (both below 500 ft) were fatal. Based upon these statistics, it can be assumed that bailouts above 1000 ft AGL will be successful. The delay occasioned while everybody dons their chutes could well prove fatal. It should be noted that in the latest case, although the collision occurred at 5000 ft, the first crewman exited at only 2500 ft and the pilot near 1000 ft. They were not wearing chutes when the collision occurred."

Presently, the requirements for wearing parachutes are the same as they were at the time of the successful bailout described above. The facts speak for themselves; S-2 operators can draw their own conclusions. ◄

Outrigger Rescue



ALTHOUGH an F-4B pilot who ejected over water had an injured arm, he was able to release both koch fittings with one hand.

"The aircraft was still fully stalled at 240 kts, approximately 50 degrees nose down. I called 'Eject! Eject!' to my RIO. The aircraft was rolling to the right, passing wings level at 7000 ft. I heard a bang, indicating that my RIO had initiated ejection.

"Ejection was violent and I had not achieved a good grip on the face curtain. My left elbow and left knee were dislocated by the time I found myself in the chute. I saw the aircraft explode directly beneath me. My RIO's chute was about 1000 ft below me to seaward. During the descent, I realized that I would land in the water and located my koch fittings. I attempted to use my primary radio but mistakenly decided that it was inoperative. This was due to the volume being full down and I was unable to hear the beeper. I saw my RIO enter the water. *(In spite of search efforts, the RIO was not recovered. – Ed.)* At about 1000 ft I deployed my seat pack and heard my raft inflate. I then inflated my Mk-3C and entered the water off shore.

"Entry was gentle and my knee popped back into place. I was able to release both koch fittings with my right hand. My raft was only partially inflated and I was unable to get aboard. I waved to the orbiting aircraft, draped my right arm over the raft and waited. My chute remained under me the entire time but presented no real problem. In a short time, I was picked up by four natives in an outrigger and was transferred, via raft, to an Air Force *Albatross*. . . . It is significant that I was able to contact the SAR aircraft with my secondary radio while in the outrigger. I informed them of my injuries."

The pilot had lost both his helmet and mask in the ejection. The oxygen hose remained attached to his torso harness and showed evidence of extreme forces which broke the metal elbow connecting the oxygen hose and the mask. The pilot inflated his PK-2 raft and Mk-3C while descending in the chute. The raft did not fully inflate due to failure of the inflation valve to remain open. The Mk-3C inflated properly; however, the pilot noted when he was in the water that the snap connectors had separated and the Mk-3C spread out. Still, it provided excellent flotation qualities. The pilot thought the connectors had broken but investigation revealed one broken and the other intact; presumably it had been unfastened. ◄

notes from your flight surgeon

THE PEN IS MIGHTIER

ON A recent cross-country flight from a naval air station to an Air Force base in an A-6A, the squadron flight surgeon acted as crewman and lineman. As anticipated, AFB personnel were not checked out in this Navy aircraft and it was necessary for the crewman to install the five ground lock safety pins when the plane was in the chocks. As the aircraft entered the chocks, the pilot opened the canopy. The flight surgeon disconnected the anti-G suit, lap belt, leg belts, oxygen mask, radio connection and ejection seat connections. After detachment from the cockpit, he still had on an orange flight suit, helmet, survival vest, torso harness and anti-G suit. As he climbed out of the cockpit, placing his right foot in the aircraft ladder, he shifted his weight to the right foot. This action caused his left shoulder to move in a right forward and downward direction. A U.S. Government-issue ballpoint pen slipped gracefully from the pencil pocket located on the left upper arm. The pen fell 12" forward of the starboard jet intake and was immediately sucked into the engine, digested and excreted. Inspection of the starboard jet engine revealed minimal damage not requiring repair.

Seldom is the flight surgeon the source of FOD. We have all noted the warnings around squadron areas and air stations. Even more alarming is the fact that the pen, flight suit and procedure were regulation. The operations officer (pilot of the aircraft) recommends the starboard engine be shut down before the right seat crewman leaves the cockpit (except for ejections). The flight surgeon recommends that pencils and pens be carried in zippered pockets while flying similar aircraft.

LT R. C. Small, MC
VA-52

E-2A DITCHING

WHEN THE No. 4 cross-deck pendant broke after an E-2A had caught it, the aircraft continued off the angle deck. Both instructor pilot and student pilot braced themselves for the impact.

The aircraft entered the water in level flight at 40 kts. Both men released their torso harness fittings. Having time, the instructor put his seat back, removed his PK-2 life raft and placed it on his lap.

The student was unable to open his hatch. Every time he pulled the lever the pressure leaked out in short hisses. The instructor motioned for the student to wait until the aircraft was clear of the ship before egress as they appeared to be floating well and water had not entered the cockpit although it was at eye level on the side window. The instructor tried his hatch and since it worked, resecured it until the ship went by. He did not want to increase water entry by reducing the cabin pressure.

Once the ship was past, the

hatches were opened easily. The instructor stood up, tossed his life raft out, then egressed. The student was unable to remove his raft although he went back down for it after exiting partially. At the instructor's urging he abandoned his attempts and climbed out through the hatch. They inflated their Mk-3Cs and then jumped off the nose of the aircraft into the water. The instructor inflated his raft and entered it.

Almost immediately the helicopter was overhead. The student entered the sling and was hoisted. The instructor got clear of his raft and was also picked up by means of the sling. It was later determined that the time between impact and arrival back on the carrier deck was 3 1/2 to 4 minutes.

"The survival training which these pilots had undergone in the Dilbert Dunker, deep water survival, and ditching drills was a strong factor in the logical, orderly way they reacted to their accident," the investigating flight surgeon reported. "The confidence gained from practicing and thinking through emergency procedures is evident. The instructor is to be commended for his guidance of his student in this emergency. A student's performance in a stressful situation often is greatly affected by the confidence he has in his instructor and the confidence his instructor has helped him develop in himself.

"More room in the cockpit for maneuvering and for removal of the PK-2 raft from the seat is afforded by first sliding the seat aft," the flight surgeon continues. "Sliding the seat aft is also essential in E-2A bailout procedure in order to release the back pack from the seat and this should be emphasized in ditching drills as well."

The instructor pilot praised the work of personnel involved in the rescue: "We both felt that the helo crew and ship's company involved were extremely proficient in maneuvering and in the recovery and we express our sincere thanks and those of our families and friends."

BASIC RULE

A BASIC rule of combat flying is to keep your hardhat visor down. Getting part of the canopy in your face or eyes after a 37mm hit will prevent you from returning with what otherwise might be completely flyable aircraft.

LCDR Jim Quinn, VA-94
A-4 Crossfeed

TIGHT CHINSTRAP

THE HARDHAT worn by a UH-1E copilot lifted several inches off his head on impact. If his chinstrap had not been tight, the helmet most certainly would have flown off, the investigating flight surgeon reports. The helmet probably prevented head injury during egress; yellow paint from the door frame was found on the helmet after the accident.

SLIT SLEEVES

A FIRE retardant flight suit cannot offer you maximum protection if you modify it.

A pilot in a helicopter accident had slit the sleeves of his nomex flight suit so that he could roll them up. When the helicopter crashed and burned after engine malfunction, he sustained second degree burns on both forearms. (In the same accident the copilot's failure to wear flight gloves resulted in his receiving second degree burns on his left thumb.)

Investigators state that the nomex flight suits worn by both pilot and copilot minimized the severity and extent of the burns received.

"The nomex flight suit is a valuable item of flight clothing," the investigating flight surgeon reported. "Both men feel that for the amount of fire in the cockpit they received minimal burns. I agree."

VALUE OF SIGNAL FLARE

"WE DID not immediately spot the survivor," a SAR helicopter rescue copilot stated, "but as we began searching, the A-3 overhead reported a smoke flare aft of our position. As we turned, I spotted the last trace of smoke from the flare and headed the helicopter for it. As we reached the area of the smoke, the first crewman spotted the survivor on our port side."

"The value of signal flares is again confirmed in this accident," an endorser wrote. "Since repeated rescues have been effected through their use, all pilots and crewmen must be completely checked out in their use and be fully apprised of their value."

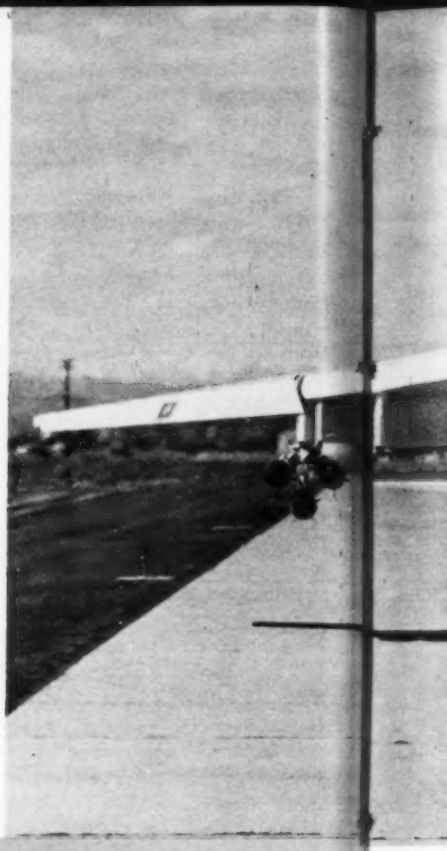
COLDS AND FLU

HERE'S an item picked up last winter from an aviation safety council's minutes. It's as pertinent now as it was last January.

"Our cold and influenza rate has been extremely high since we left port and we have had a large number of pilots down. Many who had severe colds did not bring this to the attention of the flight surgeon until they had complications. Then it was discovered that many had been using self medication. These cold medications characteristically cause drowsiness and a decrease in reflex time. These effects may not be noticeable on the deck but at 5000 ft they may become critical."

LT N. W. Lawson, MC

TF30 Engine Cockpit Smoke Problem



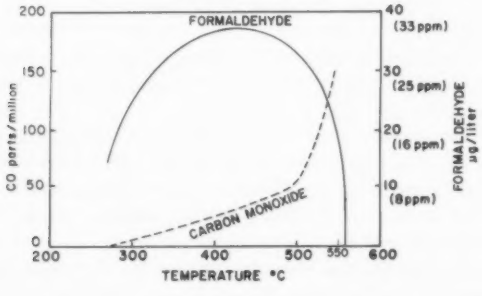
NARF engineers design test to assure absence of cockpit smoke and toxic byproducts.

SMOKE in the cockpit of A-7 aircraft is a recurring problem, due to synthetic oil (Mil-L-23699) leaking by seals in the TF30 engine. The oil becomes pyrolized (decomposed) due to engine heat, and smoke and toxic byproducts enter the bleed air taken off the 16th stage compressor for air conditioning the aircraft cockpit. This generation of smoke usually occurs while the aircraft is on the ground; especially during a full-power turnup of a cold engine. Pilot reactions are chiefly related to irritations, particularly to the eyes.

NARF Norfolk engineers, working with the NAS and Naval Safety Center industrial hygienists, sought to develop a testing procedure to detect the existence of this problem during repair of the TF30 engines. Research by the Safety Center revealed that the Royal Army Medical Corps (Porton, England) conducted both animal and human research in 1960 on the effects of exposure to synthetic oil breakdown products. The synthetic oils tested differed chemically from our Mil-L-23699, but it can be inferred that the oxidation byproducts contain similar toxic chemicals, including significant amounts of carbon monoxide, formaldehyde and acrolein. The latter two chemicals are very irritating to the eyes.

The British data was based chiefly on exposure of animals and humans to oil breakdown products from a

concentration of .2 mg of oil per liter of air, *assumed* by British jet aircraft manufacturers to be the maximum probable amount of cabin air contamination. At temperatures below 500°C, the carbon monoxide did not exceed 400 ppm, but the relatively high concentration of formaldehyde (very irritating) proved to be a useful warning. Above 500°C, carbon monoxide (CO) increased rapidly and the formaldehyde concentration fell away, indicating that the formaldehyde irritation warning could be lost at these high temperatures. This phenomenon is illustrated in the accompanying chart.



The maximum production of formaldehyde would be extremely unpleasant for a pilot and eye irritation (tears) might seriously interfere with instrument reading, but there would be no significant danger of sudden loss of consciousness from either the formaldehyde or the carbon monoxide.

NARF engineers are developing a simplified testing procedure to assure that there are no significant toxic byproducts entering the bleed air after repair of TF30 engines. Air will be taken directly off the appropriate compressor stage of the engine, routed continuously into a clear plastic box where sampling will be conducted by detector tubes for carbon monoxide and formaldehyde, and reactions will be observed for significant odors and eye irritation effects.

This simplified testing procedure has possible application to other smoke-in-the-cockpit incidents. A review of reported serious smoke-in-the-cockpit incidents shows that approximately 70 occurred in the 1963-67 period, with many of these related to oil decomposition fumes. ◄

SUPERVISION
An Indispensable Element

SUPERVISION is an indispensable element of aircraft maintenance. There always seems to be a shortage of adequately trained personnel, necessitating the use of untrained or inexperienced personnel to perform many maintenance functions. In such cases, the need for adequate supervision is elementary. Consider this incident:

Improper torquing of an oil return line fitting was the stated cause of a T-34 incident which could easily have turned into a disastrous accident. About seven minutes after takeoff on a maintenance test hop, oil appeared on the windshield. The smell of oil pervaded the cockpit and oil was seen to be bubbling from beneath the engine cowling. The oil pressure dropped to zero and the prop began to surge between 2500-2800 rpm. The throttle was retarded and an emergency landing was accomplished without further incident.

Upon inspection, the oil return line was found to be disconnected. Further investigation revealed that the oil return line had been installed under an ASC by an airman who had been under training for less than a month. The airman had *used only his hands* to secure this fitting instead of properly completing the job with a wrench. A collateral duty QA inspector checked the work, but he *also used only his hands* to check for proper torquing, thus missing the loose connection.

Although it was an improperly torqued fitting which was cited as the immediate cause of the loss of oil and resultant problems, the real culprits were:

- *Inadequate training or experience.*
- *Inadequate supervision.*
- *Inadequate quality control.*

Any one of these factors have the potential to cause mischief, but when they exist in combination – trouble is guaranteed.

Of the three, inadequate supervision seems to be the most fatal to successful maintenance. Inadequately trained men *can* do the work if necessary – and it is often necessary – provided that their work is adequately supervised.

Quality assurance should not have to fill the void of inadequate supervision. The proper QA function is rather to monitor and control the end product. Therefore, it

does not degrade QA to say that if the work is done properly, lack of adequate QA will not undo it.

In the final analysis, it is the maintenance supervisor who must shoulder most of the responsibility for the results when using untrained or inexperienced personnel to perform aircraft maintenance.

Another important point to be noted is, the use of inexperienced personel is not the only reason that supervision is essential. If every billet in the Navy were filled with master chief petty officers, supervision would remain an essential and indispensable element. Regardless of how well versed each individual may be, because of the complexity of today's aircraft and the associated maintenance tasks, there will always exist a need for coordination of effort. This is a legitimate supervisory function. The fact that personnel who actually do the coordinating may not be in the direct chain of command does not change the fact that coordination, when effected, is an important form of supervision. Likewise, when it is not effected, an essential element of supervision is missing.

In one recent incident an aircraft suffered extensive damage, primarily because of lack of coordination among the personnel who were performing the maintenance.

At approximately 1935 on the day of the accident, a TAF-9J was downed for a hydraulic leak by the plane captain. It was determined by maintenance personnel that tail and engine removal would be required to replace the main hydraulic system accumulator. Subsequent to changing the accumulator by airframes personnel, the power plants shop was notified that the aircraft was ready to have the engine reinstalled.

At that time the power plant's night check supervisor assigned the job to a three-man crew, supervised by an ADJ-2 (a collateral duty inspector) and two ADJ-3s. Upon completion of the engine installation and a cursory inspection by the crew leader, the night check supervisor was notified that the powerplant's portion of the installation was complete.

At 2300, the mid-crew relieved the night check crew. The mid-crew supervisor was informed verbally by the night check supervisor that the aircraft would be ready for turnup as soon as the electricians had completed their connections.

At 0030, after the electricians completed their work, the aircraft was towed to the hot spot and properly positioned for a turnup. The turnup was conducted by an ADJ-2 and his assistant, an ADJ-3. After securing the aircraft to the hot spot properly, a limited preturnup inspection of the engine installation was made. The ADJ-3 manned the cockpit to turnup the aircraft while the ADJ-2 plugged in the NC-5. The ADJ-3 then went through a prestart check of the switches and signaled for external power. Omitted at this point was a requirement to bleed the high pressure fuel pumps while the low pressure electrically driven pumps were operating. Upon receiving power, he initiated what appeared to be a normal start. The EGT rose to 565°C and the RPM stabilized at 34.5 percent. While attempting to push in the inverter circuit breakers he observed the EGT warning light to be ON and the temperature to be around 950°C. At the same time, the ADJ-2 on the NC-5 observed that the engine was torching excessively and the tailpipe was starting to glow red. As the ADJ-2 jumped off the NC-5 to tell the ADJ-3 to shut down the engine, he observed a fluid leak under the aircraft. Immediately thereafter, a flash occured and the aircraft caught fire. Meanwhile, the ADJ-3 upon observing the high EGT indication and flames from the aft portion of the aircraft, shutdown the engine by placing the throttle off and securing the fuel master and start master switches.

He exited the cockpit and aided the ADJ-2 who was attempting to put out the fire with a CO_2 bottle and a dry chemical (Purple K) fire extinguisher.

Before attempting to completely control the fire, the ADJ-2 ran to the phone in the hot spot shed. In his excitement, unable to remember the number to report a fire (333), he dialed 222, the ASDO's office, and notified them of the fire.

Meanwhile in the line shack, the crew on duty observed the fire and called the fire department. Approximately eight minutes after the fire broke out a crash crew and fire truck arrived on the scene and extinguished the fire.

The aircraft received severe fire damage to the plenum chamber, starboard wing root and extensive damage to the starboard wing and starboard side of the fuselage, to, and slightly beyond, the wing root intake.

Investigation of this accident brought out the fact that check lists, MRCs, or other publications were not sufficiently utilized during the engine installation. This deviation from established maintenance procedures resulted in failure to connect that portion of the main fuel line between the engine driven boost pumps and the electrically activated fuel shutoff valve.

It was determined that the crew leader (a collateral duty inspector) inspected the engine installation without reference to pertinent publications. However it was stated squadron maintenance policy that a collateral duty inspector not involved in the actual installation, could inspect the completed work utilizing proper checklists.

The mid-crew supervisor accepted the turnover from the night check supervisor without the required

paperwork (MAFs, etc.), which is also contrary to squadron policy.

Since there were no quality control personnel assigned to the mid-crew and the job was not completed until after the check had secured, the power plant's mid-crew supervisor sent the aircraft to the hot spot for turnup without the required quality control inspection.

It was determined that the engine turnup was not conducted in the approved manner. First, there were not sufficient personnel present and second, a number of routine checks were omitted. The most serious of these omissions was the failure to have a man enter the starboard intake prior to start and bleed the high pressure fuel pumps while the electrically driven low pressure boost pump was running. Had this been done, the fuel leak (and the unconnected fuel line) would undoubtedly have been discovered.

The AAR Board had numerous comments concerning the events which culminated in this disastrous fire, and they were to the point, but the fact remains that the established system for performing this particular maintenance evolution safely, broke down from a lack of adequate supervision as the maintenance task progressed step by step.

Another case, simpler in its occurrence, but almost equally disastrous involved a US-2C. While routine line maintenance was being performed on this aircraft, a sudden, explosive fire broke out in the port wheel well area, enveloping the port nacelle in flames. Four line maintenance personnel were in or around the aircraft, one in the cockpit repairing the G-2 compass, one in the starboard wheel well, one in the port wheel well cleaning the nacelle area, and the fourth man was working in the nose gear area.

The aircraft was being prepared for a short deployment. The two men in the main wheel wells were cleaning external surfaces with a mixture of aviation gasoline and hydraulic fluid (in a 4-1 solution). Coincident with the external cleaning, the electrician commenced work on a G-2 VGI system discrepancy. External power was applied to the aircraft and when the electrician energized the main inverter by pushing in its circuit breaker, an explosive fire occurred in the port nacelle, site of the main inverter.

Extensive fire damage resulted as a consequence of the fire which was fed by concentrated fumes in the wheel well plus extensive oil and grease present on the interior bulkheads of the wheel well.

The fire was fought utilizing CO_2 bottles which were on hand. The crash crew arrived on the scene within a minute and extinguished the fire using both foam and P-K-P for the less accessible area of the nacelle.

The prime cause of the accident was attributed to the use of the gasoline/hydraulic fluid mixture as a cleaning solvent. True, but wasn't inadequate supervision the real, underlying cause of this accident? Didn't maintenance supervisory personnel fail to insure that two relatively inexperienced men used an approved cleaning solution for this task? The fact that the use of this cleaning solution (in contravention to instructions) had become a common practice in this squadron does not excuse the lack of adequate supervision. It only points out that the chain of supervision broke down sometime well in advance of this particular disaster.

The role of the supervisor varies with his position in the maintenance organization. It is sometimes difficult to identify the responsible supervisor for every facet of every maintenance evolution or task – but, there *is* a responsible supervisor. The position he occupies is somewhere between CNO and the newest man on the line, but he exists.

In the incidents and accidents already discussed, there was a supervisor who had the responsibility, *but failed to insure that:*

- The untrained airman who installed the T-34 oil return line was properly instructed in the work he was to do, and that it was properly inspected after completion.
- The checklists and MRCs were utilized incident to the TAF-9J engine installation, and the subsequent inspection prior to turnup.
- The inspection of the TAF-9J was accomplished by an inspector who was not involved in the actual installation.
- A turnover was not effected between the TAF-9J night check crew and mid-crew supervisors without the required paperwork.
- Adequate personnel were present to accomplish the TAF-9J engine turnup, including the prescribed checks.
- The aircraft was not released for turnup without the required QA inspection.
- An approved cleaning solution was used to clean the US-2C.
- Electrical work, with the attendant possibility of arcing, was not performed on the US-2C while flammable mixtures were being used in or around the aircraft.

These accidents and incidents could have been prevented had the petty officers in charge of the various operations been more aware of their responsibilities and acted to provide the proper supervision. As a maintenance supervisor, are you aware of all your responsibilities? Are you providing supervision equal to your responsibilities? It's something to think about. ◄

CRUISING COOL

Recip with the recips – Lower CHTs mean your engine will last longer.

THERE are several types of reciprocating engine difficulties which can be related to cylinder head temperature and time of operation. These include exhaust valve burning and breakage, loosening of exhaust valve guides, valve guide boss erosion and other cylinder head combustion chamber discrepancies noted at overhaul.

Statistics of premature engine removals show that these difficulties are sporadic and may be confined to certain engine models and installations. The contractor has development programs to provide additional design margins in these areas, but very effective immediate corrective action is to maintain cylinder head temperatures during operation at the lowest practical value possible.

During cruise the allowable cylinder head temperature limit is 232°C, the maximum temperature being the engine specification limit. All engines will operate satisfactorily at the maximum temperature limit for a period of time. Demonstration of this maximum limit is a requirement before the engine can be approved for service use. However service experience, over a long period of time as well as experimental test experience, has indicated that for increased time between overhauls, temperatures lower than the specification are required to alleviate the troubles we refer to here. For this reason it is strongly recommended, where possible within the limitations of the aircraft load and speed conditions, that the *cowl flaps be adjusted to maintain cruise cylinder head temperatures as low as possible.* Spark plug fouling at this temperature limit will not be experienced based on spark plug ceramic temperature surveys.

To relate a little more detail in support of these recommendations, the contractor's experimental testing has shown that the exhaust seat distortion which is the main contributing factor to exhaust valve leakage, burning and eventual valve breakage is due to the creep of the aluminum material in the cylinder head. Maximum creep occurs in that area of the cylinder head close to the exhaust port outlet. It is this area of the cylinder head which is more difficult to cool because of the right angle outlet of the exhaust port. With this area running hotter, the pressure of the valve seat insert against the aluminum counterbore causes the aluminum to creep an unequal amount resulting in a distortion of valve seat sealing surface.

Metallurgical properties of the aluminum alloy material show that at temperatures above 200°C, the creep properties, with time, are severely progressive with small increases in temperature. Thus, moderate reduction of temperature can be very effective in minimizing these creep conditions and the resulting valve seat distortion. Verification of these conditions in service has been very pronounced. Some R3350-93 engines with as much as 3000 hours time showed very satisfactory valve seat condition with moderate cylinder head temperatures. Other engines have experienced severe valve leakage and eventual failures at about 1100 hours and above. These latter engines were known to have operated at or near specification head temperature limits for extended periods of time. Under experimental test conditions where the R3350 engine was submitted to 500 hours of cyclic endurance testing with operation at maximum specification cylinder head temperatures, valve and seat distress was evident at relatively low times of 200 to 300 hours.

More recently, valve burning and premature removals due to valve failures have been evident on several of the Navy's R3350 engines including the -32 and the -42 engines. It is believed that these are associated with high cylinder head temperature operations and very sharp improvement may be realized by operating with lower cylinder head temperatures.

Similarly, valve guide and boss difficulties which are related to temperature and thermal coefficient properties can be minimized by reducing cylinder head temperatures. In these cases, the exhaust gas temperature which does not always directly affect the cylinder head temperature can be a significant item as well. The proper use of leaning during cruise as specified in the operating instructions must be adhered to so as to place the engine in an environment for proper exhaust gas temperatures.

In short, maintain the cylinder head temperature as low as practical in order to improve engine durability and increase time between overhauls. – *Based on R3350 information provided by Curtiss-Wright Corp.* ◄

TA-4F/G Canopies

SINCE June 1966, there have been 16 reported cases involving difficulties with the TA-4F canopy. Three of these were apparently due to isolated and varied reasons, i.e.:

- In one case, the canopy ground control access door opened inflight, resulting in cracking and warping of the access door and a 10-inch crack in the aircraft skin covering the access door hinge assembly. Prior to the flight, the pilot had experienced difficulty in closing the canopy and the plane captain, contrary to squadron policy, assisted in closing the canopy by actuating the external control.
- In another case, the primary ejection handle (face curtain) was moved to the "stop" in the rear cockpit (seat did not fire) by the action of the rear seat pilot in positioning the instrument hood while taxiing.
- In the third case, FOD (a rheostat knob) became wedged between the canopy frame and inboard roller and canopy latch bar during flight. Upon landing, it was necessary for maintenance personnel to loosen the canopy hinge bolts in order to free the pilot.

Inflight Canopy Incidents

The other 13 cases involved canopy problems while the aircraft was in flight. In two of these cases, the canopy opened only 1 to 2 inches and due to prompt pilot response in slowing the aircraft and holding the canopy actuating handle closed, the canopy was retained until landing. In another case, the canopy exploded inflight, apparently due to defects in the plexiglass.

Inflight Canopy Separations

The remaining 10 cases involved separation of the canopy while the aircraft was in flight. The most serious of these separations resulted in the loss of an aircraft, but fortunately, neither pilot was injured. In the other nine cases, there was no personnel injury, but the canopy invariably struck the vertical stabilizer upon separation, causing minor to substantial damage.

Inflight Canopy Separation Causes

An analysis of the causes for inflight separation of canopies reveals:

- In one case, the canopy actuating handle was moved to the unlocked position after becoming entangled in a loop of the oxygen hose.

• In two cases, including the case where the aircraft was lost, it is suspected that the pilots failed to insure that the canopy actuating handle was locked prior to takeoff.

• In some of the remaining 7 cases, pilots may have failed to insure positive canopy locking, however, *misrigging of the canopy system* is the chief suspect.

TA-4F Canopy Rigging Critical

The Naval Plant Representative Office, Long Beach, commenting in May 1968 on the results of a McDonnell Douglas Aircraft Co., investigation into the matter, stated:

"Investigation revealed that canopy losses may have resulted from improperly rigged canopy systems. Conditions have been noted as follows: Lack of gap clearances between latch hooks and striker plates, figure 3-5, NavAir 01-40AVD-2-2.4; excessively high and erratic handle loads caused by the canopy detent pin binding on the canopy control counterbalance, figure 30, indexes 29 and 34, NavAir 01-40AVD-4-6; canopy handle loads lower than the specified because of spring being improperly adjusted or damaged, figure 30, index 26, NavAir 01-40AVD-6-4 (MRCs); and oxygen or G-suit hose entanglement with the canopy handle.

"It is concluded that, if procedures for functional test of the canopy normal control system, outlined in Table 3-13, NavAir 01-40AVD-2-2.4, were adhered to and directions to perform same were incorporated in MRCs (NavAir 01-40AVD-6-4), canopy losses attributed to misrigged conditions could have been averted.

"It is recommended that TA-4F aircraft normal canopy control systems be checked in accordance with Table 3-13, NavAir 01-40AVD-2-2.4 and rigged accordingly as soon as possible not to interfere with flight operations but not later than the next 10 flight hours; also that pilots observe the following procedures prior to takeoff:

"a. With canopy open, visually and physically check that canopy latch indicator pin located forward end of LH cockpit rail is flush.

"b. Close and lock canopy and definitely bottom out handle and insure positive detent action is noted (handle springs forward).

"c. Pull handle aft (do not unlock) to check for increase in handle load, immediately push forward to lock.

"d. Physically and visually check that the lock indicator pin protrudes minimum of 1/8 inch.

"e. Insure canopy seal inflation occurs (approximately one minute is required for inflation, 3/4 minute for deflation).

"f. Insure latch hooks protrude into striker plates.

"g. Insure oxygen/anti-G hoses are clear of canopy handles.

"h. Note handle loads – high/low/normal or erratic.

"If any of the above are not met, the aircraft should not be flown until corrective action is taken in accordance with NavAir 01-40AVD-2-2.4"

Rerigging by McDonnell Douglas Team

Subsequent to the above, Interim A-4 Airframe Bulletin No. 100 was issued, in June 1968, providing for an inspection and rerigging of all TA-4F/G canopy systems. This inspection revealed numerous aircraft had misrigged systems. The inspection was accomplished by a McDonnell Douglas Aircraft Corp., field team, who at the same time, instructed squadron maintenance personnel in the exact rigging procedures.

The Fix

ECP 859 (AFC 358) was developed to provide for a canopy lock *indicator;* ECP 918 (AFC 419) was designed to provide a warning light installation which would warn the pilot whenever the canopy is unlocked. Neither of these changes, however, are considered to be an effective solution if the canopy is misrigged – and, as already stated, canopy misrigging appears to be the primary cause of canopy losses. NavAirSysComHq, therefore, requested the McDonnell Douglas Aircraft Corp., to prepare a revision to ECP 918. The result of this request is ECP 918A, which contains two alternate proposals. One proposal is for an additional mechanical override latch bar arrangement to supplement the existing canopy latch bar mechanism. The other (alternate) proposal is identical except that it also makes provision for a canopy warning light. This alternate proposal would use the same warning light provided by AFC 419, but incorporating a light actuating mechanism corresponding to the new locking mechanism. ECP 918A would also cancel ECP 859 (AFC 358) as the canopy lock indicator would no longer be a requirement.

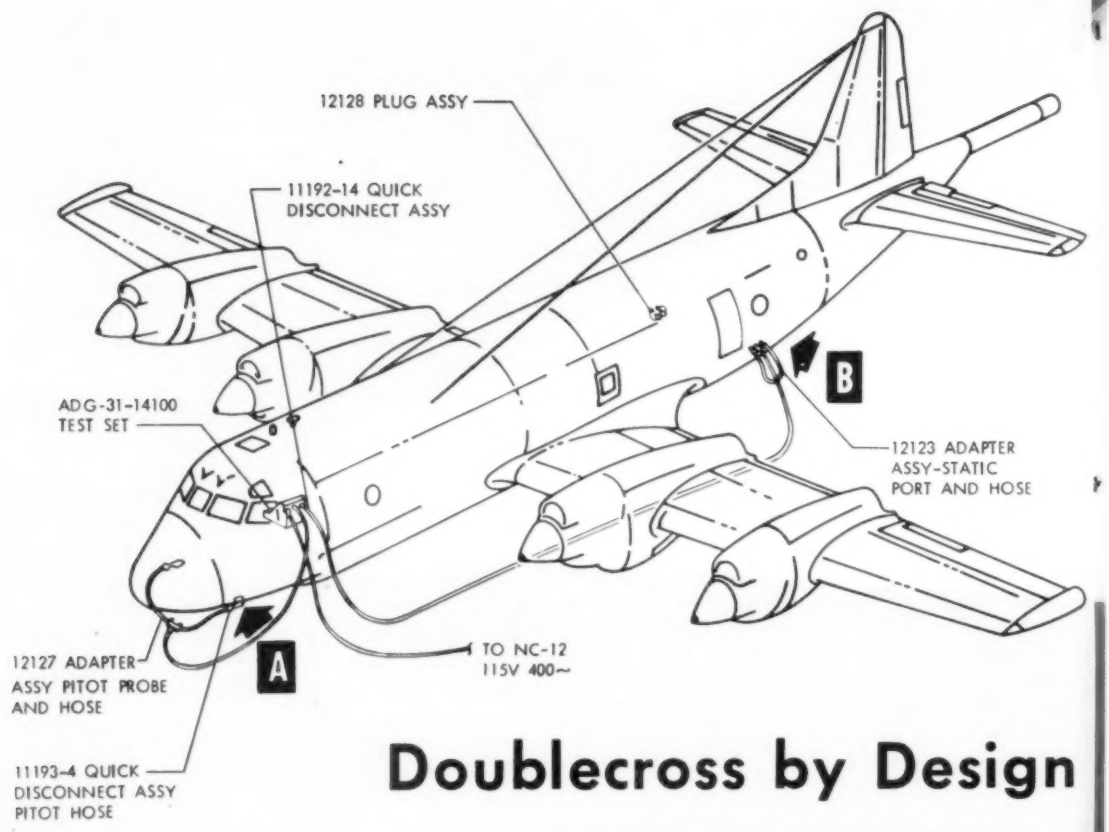
The proposal to be selected by NavAirSysComHq is not known at this time. That is, issue of an AFC providing for an additional mechanical latch bar arrangement per ECP 918A is expected, but it is not known whether the AFC will include the warning light provisions previously discussed.

In either case, it is not expected that the retrofit kits will be available to the fleet before the Spring of 1969.

Interim Measures

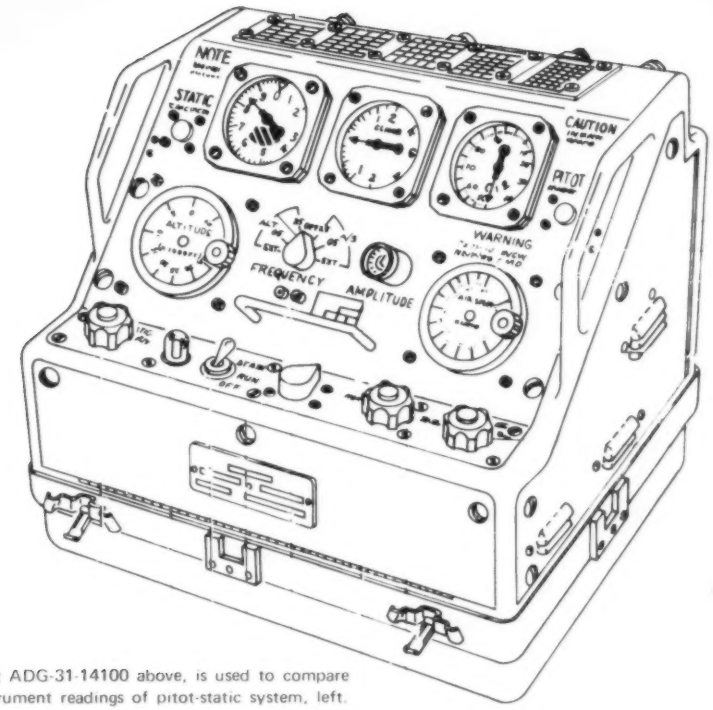
In the meantime, it is concluded that meticulous attention to rigging the canopy in accordance with the Maintenance Instruction Manual (NavAir 01-40AVD-2-2.4) and completion of functional checks by the pilot as recommended by the Naval Plant Representative Office, Long Beach, offer the best assurance against future TA-4F/G canopy malfunctions.

MURPHY'S LAW*



Doublecross by Design

NOT long ago *APPROACH* called attention to the P-3's pitot-static system as being virtually Murphy-proof. That is, the plumbing is made up of 3/8 in and 5/8 in B-nut fittings and staggered lengths of tubing so that inadvertent cross-connection at any point would be impossible. Any point *except* at the instruments – airspeed indicator and altimeter. Cross-connection at this point is possible – and quite probable as the following case bears out. Cross-connection at the instruments *seem* to recur quite



Air Test Set ADG-31-14100 above, is used to compare cockpit instrument readings of pitot-static system, left.

frequently in spite of the requirement that a functional check with Air Data Test Set ADG 31-14100 be performed whenever the system requires maintenance action.

This, the latest reported incident, cites a P-3A pilot on takeoff noting no airspeed indication just before reaching the maximum refusal point on the runway. He managed to abort the takeoff without incurring reportable damage. Investigation of the no-airspeed indication revealed that the pitot and airspeed indicator plumbing were crossed at the instrument. Here the lines terminate at the same point and the fittings are identical in size and threads to accommodate instruments which are government furnished equipment.

A quality controller had inspected the installation but did not detect the cross-connected tubing since the markings on the back of the indicator are small raised letters adjacent to the fittings. These are difficult at best to read after the instrument is installed in the panel. Since a functional check was not performed on the line, discovery of the maintenance error came the hard way.

Our purpose here is to remind P-3 maintainers of this booby trap and to reemphasize the importance of the functional check with the test set whenever plumbing is disconnected and reconnected. But, it appears instrument design specifications are overdue for updating to parallel those imposed on aircraft designers to eliminate Murphy's Law in a critical flight system. ◄

*** If an aircraft part can be installed incorrectly, someone will install it that way!**

Letters

Nomex Suits

Norfolk, Va. – I read the article "Nomex" in the April 1968 issue. Somewhere I heard that the nomex flight suit protected some people in the FORRESTAL fire last year but I can't verify this. Do you know anything about this?

ANYMOUSE

• The Safety Center has had no official reports on this. However, an item on nomex fabric in a recent issue of the Naval Air Systems News included the following paragraph:

"The newly adopted Navy flame-retardant flight coveralls and gloves were credited with saving many aircrew personnel from severe burns during the FORRESTAL fire. It was observed that those who were burned while wearing clothing sustained burns only where not covered by the clothing. In one instance, a man in a Navy (nomex) flight suit crawled across 100 ft of firey nonskid flight deck without even skinning his knees."

Waterproof Parachute Containers

NAAS Saufley Field – Unexpected rainshowers are prevalent in this area in the spring and summer. After one such shower we had to down 25 installed parachutes. (Students are required to turn the parachutes in to the ready issue room after each training hop.) Although most of the chutes had only a few rain sprinkles on them, the 25 chutes were downed because they were damp. Water spots don't stay on the outside of the parachute container for more than five minutes unless the container is really soaked – the moisture is absorbed into the parachute canopy.

I believe this situation could be corrected if the outside of the parachute container was treated with a spray-on type water repellent. However, this cannot be done at command level. I respectfully suggest sufficient testing to permit use of a water repellent on parachute containers in areas such as VT commands where chutes are handled a lot.

PRAN JON D. STOCKBERGER
VT-1 MAINTENANCE
NAAS Saufley Field

• We have forwarded your report to the Naval Aerospace Recovery Facility, El Centro for appropriate action. Any further developments will appear in *APPROACH or Personal/Survival Crossfeed.*

Believes in High Viz Paint

Corpus Christi, Tex. – All-white TS-2As are arriving in Advanced Training Commands. An all-white TS-2A is very hard to see. Why not spend $35 per copy and keep the same paint scheme for safety's sake? Our winter and spring flying here in Corpus is conducted mostly between or below stratus overcast layers. The visibility at these times is generally quite poor – the classic milk bottle effect. I speak with three years' experience as a flight instructor in the Training Command and I feel we will have a marked increase in near misses and possibly a midair. The cost in lives and aircraft from one midair would pay for red paint *forever.*

The Advanced Training Command has a noticeable lack of midairs. Let's keep it that way.

FORMER ASO

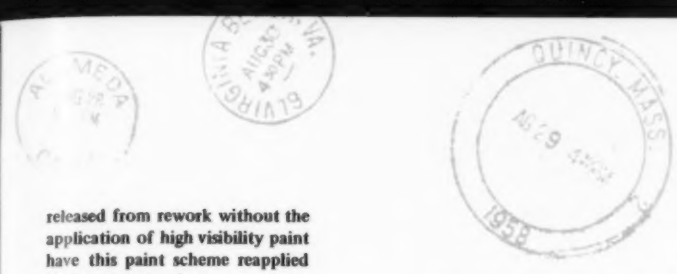
• The subject of high-visibility paint schemes has recently been receiving attention at all echelons of command. The latest word on the subject is CNO msg 021220Z of Aug 68. This message states, in effect:

Although the NavSafeCen is not able to isolate high visibility paint as a factor in the relatively low number of midairs experienced by the NavAirTraCom, there is no factual evidence to indicate that the high visibility paint scheme has not effectively served its intended purpose. In view of this and available statistical data pertaining to midair collisions/accidents/incidents, it is not considered appropriate to discontinue the use of high visibility paint. Therefore, the policy contained in CNO ltr OP-502V/PEP ser 2016P50 of 18 Feb 64 remains unchanged.

It is desired that those aircraft

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request.

Address: APPROACH Editor, U. S. Naval Safety Center, NAS Norfolk, Va. 23511. Views expressed are those of the writers and do not imply endorsement by the U. S. Naval Safety Center.



released from rework without the application of high visibility paint have this paint scheme reapplied at the next rework.

History Bit

Alexandria, Va. – "The Ambulance in the Valley," July 1968 pages 24 and 25, rings a familiar tune. Thanks to APPROACH and VT-25, I now have a copy. I first saw it in the A.S.M.E. *"Mechanical Engineering"* magazine circa 1937!

Still valid!

• Thank you for this interesting bit of history. We are indebted to the unknown author. Hopefully, this thought-provoking comment on human nature will serve in a small way to improve safety in naval aviation.

P2Y Information

Renton, Wash. – I was rather surprised to see the cover illustration of the August, 1968, APPROACH. In the last 27 years I have consistently looked for P2Y illustrations and history in every pictorial "guide to naval aviation" I could find. It has long bothered me that most earlier and later vintage aircraft are covered but very seldom do you find any mention or photographs of the P2Y.

With something over 400 hours in a P2Y-2 (VP14P2) (later VP52P2) I was doubly surprised to see the APPROACH illustration with strut mounted engines. The P2Y-2 and -3 aircraft had wing mounted engines. However, I don't remember seeing a P2Y or P2Y-1, so wonder if the early models were made with the Commodore nacelles. I had contact with VP-12, 13, 14, 15, 16 and 17, which all had the -2 or -3 configuration.

I rode the Neutrality Patrol out of Norfolk and Charleston during late 1939 and early 1940 and also rode the first delivery flight of a P2Y to Pensacola for their use as training aircraft.

The illustrations sure take me back in memory and I would greatly appreciate any details you might have on this subject or references to texts with P2Y data.

JACK E. REICH (Ex RM2C)

• Research of our technical library discloses that six P2Y aircraft of VP-10, under the command of CDR K. McGinnis, flew from San Francisco to Pearl Harbor on 10 January 1934. The flight was a world record, covered 2408 miles in 24 hours and 35 minutes and was cited by President Franklin D. Roosevelt as "the greatest undertaking of its kind in the history of aviation . . . a magnificent achievement." This information comes from the book *Golden Wings* by Martin Cadain, Random House, New York, 1960, pages 84 and 85. This book should be available in the Seattle Public Library, a few minutes from Renton. Sorry but we cannot locate any information concerning mounting of the engines.

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FitRon Lant/Pac

Miramar, Calif. – I have been reading your articles carefully for many years. Your advice has been invaluable and just recently, that bit about the flight not being over until the aircraft is parked and shut down proved to be true again. While rolling out in a *Phantom* after a routine landing and decelerating normally, I noticed a slight left drift from the runway centerline. I put in right rudder but since the aircraft was decelerating past 80 kts it wasn't surprising that the drift continued. Applying right brake at about 60 kts the pedal was unusually hard to depress, with no decrease in the established left drift. Well, a little emergency brake should stop the aircraft, so I pulled the handle but the drift only increased. Since we were almost in the upwind arresting gear, I put the hook down hoping that it would come down in time to engage the arresting gear. Now we were definitely headed for the left side of the runway and it appeared that we had missed the gear. I was resigned to going off the side at about 30 kts when, ever so smoothly, the aircraft was pulled to a stop by the hook which had, fortunately, engaged the arresting gear. Just before shut down the utility Pressure went to zero. Examining the starboard main landing gear we found that the block at the aft lower end of the gear, to which both the normal and emergency brake lines are connected, was improperly torqued and had rotated, on gear extension, shearing both lines completely. This caused loss of any brake action on the starboard landing gear. The loss of hydraulic fluid had reduced utility pressure and rudder effectiveness. I guess we were lucky that it didn't happen some dark night aboard ship after landing and being the first aircraft to be parked on the bow but it does prove, if you keep trying, something is bound to work.

"SONNY"

• We agree with you "that something is bound to work" just as the manual (NATOPS) says. The real pro stands out when he intelligently reacts to the unusual or a malfunction. We bet you have mentally covered this situation before and it sounds like your friendly ASO probably covered this in the ready room. A pilot who knows his aircraft and who knows his procedures is a joy to his C. O. and everyone else connected with aviation.

Vol. 14 **approach** No. 5

Our product is safety, our process is education and our profit is measured in the preservation of lives and equipment and increased mission readiness.

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NavAir 00-75-510

CREDITS

Cover art by LCDR Walt Edwards who captures the Navy's far-ranging P-3 ORIONS in a rare moment of rest.

1FC-2 Photos Courtesy, NAS Brunswick
Pg 14-16 Photos and Diagram Courtesy KAMAN ROTOR TIPS
Pg 42 Art by R. G. Smith Courtesy McDonnell-Douglas Aircraft Corp.

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Subscriptions: Single copy 35 cents; 1-year subscriptions $3.50; 2 yrs., $7.00; 3 yrs., $10.50; $1.00 additional annually for foreign mailing.

Printing: Issuance of this periodical approved in accordance with Department of the Navy Publications and Printing Regulations, NAVEXOS P-35. Library of Congress Catalog No. 57-60020.

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Next Month

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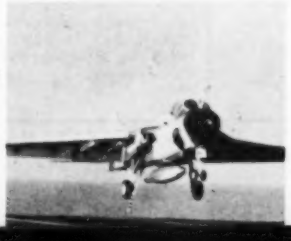
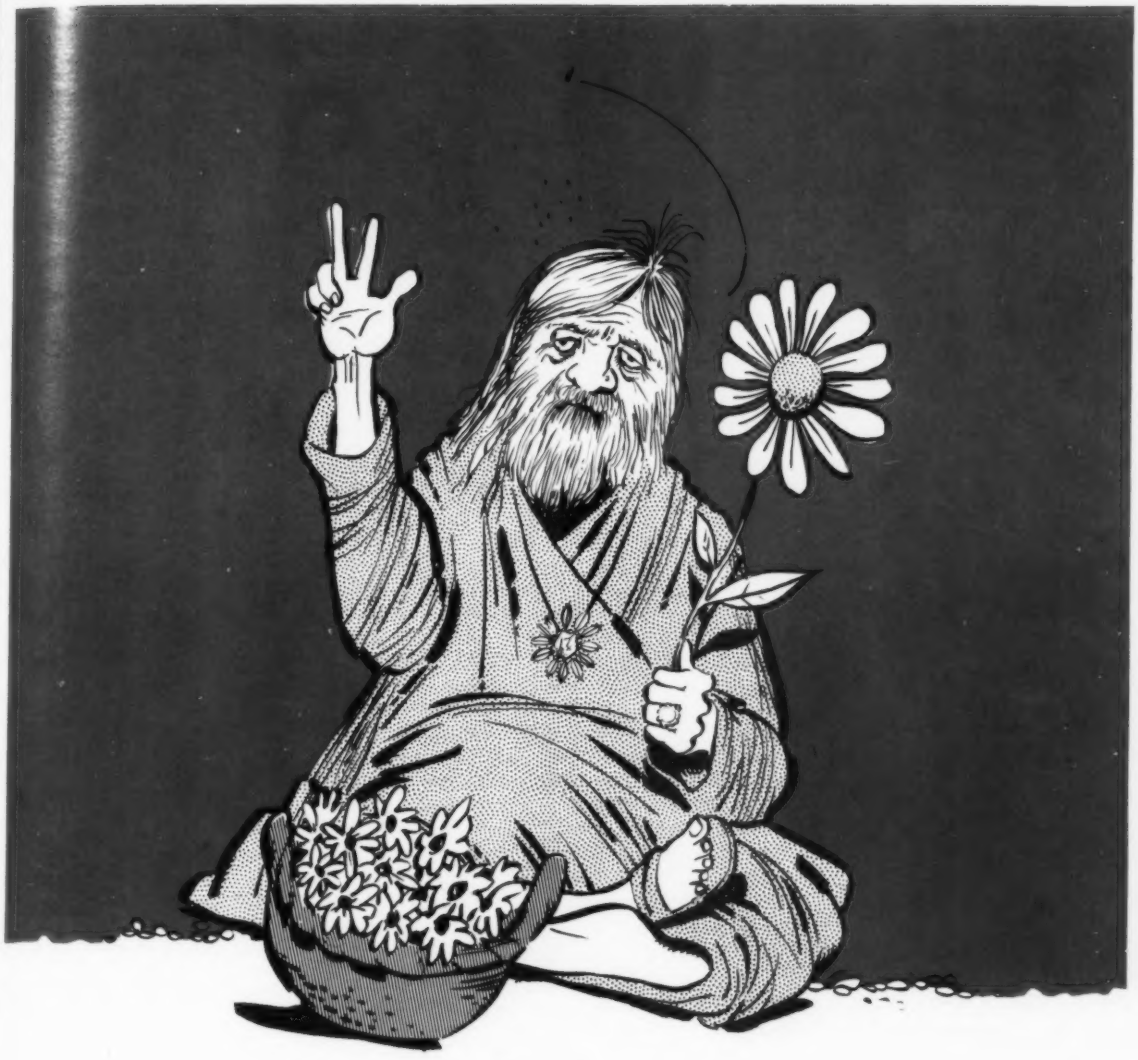


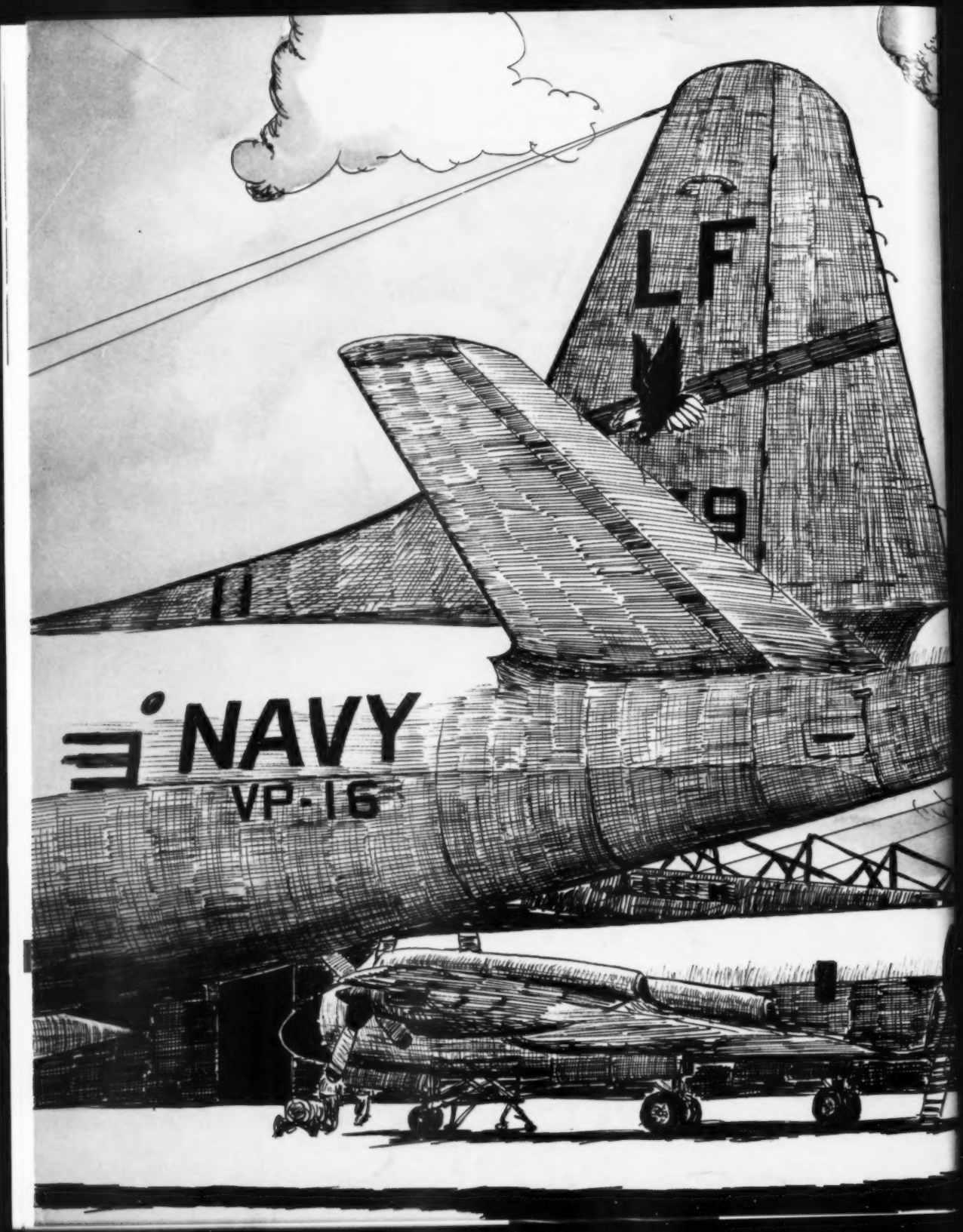
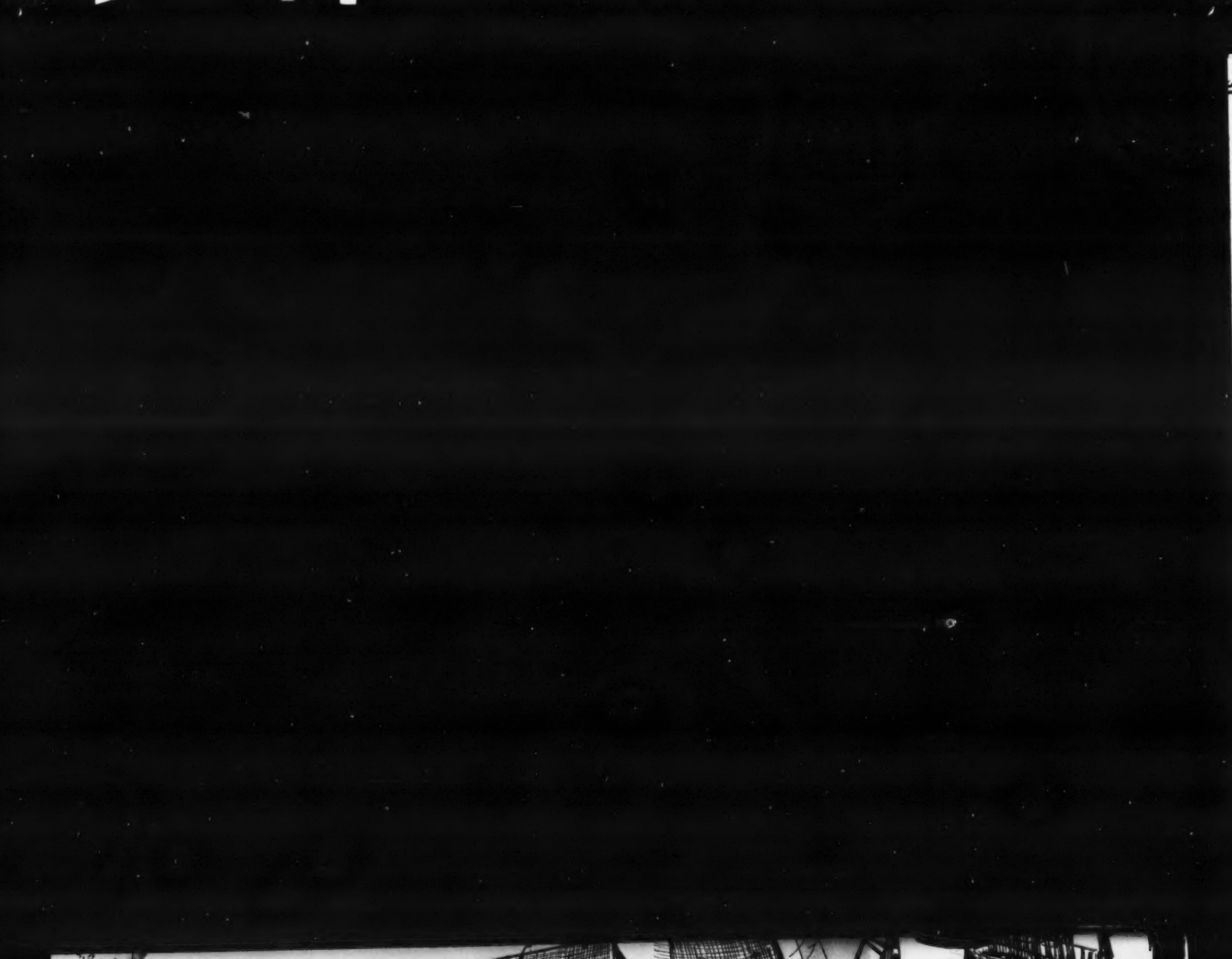
and other items of interest to the Naval Aviator.



LIFT and DRAG

It is written in NATOPS that it is
the responsibility of the pilot in command of a naval
aircraft to ensure prior to takeoff that the crew and passengers
are adequately instructed on such personal safety and survival equipment and
procedures as required for the particular aircraft in which they embark.

Subject is Survival - Sock it to 'em!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